THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XX. No. 496—23RD YEAR.] LONDON, OCTOBER 10, 1871. [Subscription per Annum. 15s. in Advance. 18s. Credit.] DOUBLE No. Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.

GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GEORGE GLOVER & CO.,
Patentees of the Standard Gasometers for the Government, and of the
IMPROVED DRY GAS-METERS.

These Meters are warranted to measure correctly and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured.

To meet the increasing demand, G. GLOVER AND CO. have just entered on possession of extensive premises adjoining their present Works in Ranelagh Road, and they are now prepared to execute promptly, orders to any extent. They keep in stock all sizes of Meters up to 200 lights. In cases of haste, on the receipt of a telegram early on one day, their Meters can be delivered next day in any part of England, and in the large towns in Scotland.

Particulars and lists of prices forwarded on application to—
RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW;
OR
15, MARKET STREET, MANCHESTER.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and other OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

JOHN RUSSELL AND CO.,
THE OLD TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.
WAREHOUSES:
69, UPPER THAMES STREET;
COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
16, SOHO SQUARE,
} LONDON
35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
Lists may be obtained on application to
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JOHN BENT & SON,
WET AND DRY GAS-METER
AND
STREET-LAMP
MANUFACTURERS,
BELL BARN ROAD, BIRMINGHAM.
ESTABLISHED 1830.
All materials found for the alteration of Public Lamps for lighting with the Rod. Regulators with Lava Burners.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS,
NEAR NEWCASTLE-ON-TYNE.
WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
London Agents: JAMES LAWRIE & CO.,
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SCOTTISH CANNEL COAL.
J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.
They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.
Messrs. ROMANS, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.
Analysis, prices, and other information will be forwarded on application to their Offices, 3, Forth Street, EDINBURGH; 1, Walbrook, Mansion House, LONDON, or to the "Crown Wharf," Thomas Street, Limehouse, LONDON, where stocks of house, steam, and gas coal are always on hand.
Coal, machinery, fire goods, &c., shipped to all parts of the world.

LESMAHAGO GAS COAL,
AUCHINHEATH COLLIERY,
LESMAHAGO N.B.

JAMES FERGUSON & CO.
LESSEES SINCE 1832.
LONDON AGENTS:
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63, OLD BROAD STREET, E.C.
CONTINENTAL AGENTS:
LA COUR & WATSON,
LEITH.

GEORGE GLOVER AND CO.,
Patentees of the Standard Gasometers for the Government,
TWO MEDALS,

LONDON, 1862.
HAVE OBTAINED THE
HIGHEST
PRIZE
FOR
SILVER MEDAL,

PARIS, 1867.
IMPROVED DRY GAS-METERS AND GASOMETERS,
AT THE
PARIS EXHIBITION.
RANELAGH WORKS, RANELAGH ROAD, PIMLICO LONDON, S.W.;
AND 236, GEORGE STREET, GLASGOW.

WHITEHOUSE AND COMPANY, LIMITED,
GLOBE TUBE-WORKS, WEDNESBURY; & VICTORIA TUBE-WORKS, GREAT BRIDGE,
MANUFACTURERS OF
PATENT WELDED WROUGHT-IRON TUBES,
FOR GAS, STEAM, AND WATER;
STEAM-COCKS, AND ALL KINDS OF GAS-JOINTS.
LONDON OFFICE: 115, LEADENHALL STREET, E.C.

HENRY HOWARD & CO.,
COOMBS WOOD PATENT TUBE-WORKS.
OLD HILL, near DUDLEY,
MANUFACTURERS OF
HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,
FOR GAS, STEAM, AND WATER;
Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,
FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.
CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.
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SILVER MEDAL, PARIS EXHIBITION, 1867.
LLOYD AND LLOYD,
ALBION TUBE-WORKS, BIRMINGHAM,
MANUFACTURERS OF
WROUGHT-IRON TUBES AND FITTINGS
For Gas, Steam, Water, &c.
SOLE LICENSEES AND MANUFACTURERS for the United Kingdom of
THE LAVENANT PATENT ENAMELLED TUBES AND FITTINGS.
LAP-WELDED IRON & HOMOGENEOUS METAL TUBES
For Locomotive, Marine, and Stationary Boilers.
Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools of all kinds.
London Offices: No. 4, Cloak Lane, Queen Street, E.C.
WAREHOUSES:
LONDON: No. 157, Upper Thames Street, E.C. LIVERPOOL: No. 63, Paradise Street. MANCHESTER: Barlow's Croft, Chapel Street, Salford. PARIS and LILLE.

WILLIAM INGHAM AND SONS,
WORTLEY FIRE-BRICK AND RETORT WORKS,
Near

Leeds.
W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.
Estimates for Setting, or Bricklayers sent when required.
GAS OVENS IN SEGMENTS OF EQUAL QUALITY.
A large Stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all Sizes kept in London at Mr. ALFRED WILLIAMS, Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.
N.B.—*Export orders continue to have prompt attention.*

TRADE MARK.

THE MEDAL FOR 1862.
The only Prize Medal awarded for TUBES & FITTINGS.
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WEDNESBURY, STAFFORDSHIRE.
WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,
PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,
ONLY MAKERS OF HOMOGENEOUS METAL TUBES.
MANUFACTURERS OF
TUBES and FITTINGS for GAS, STEAM, and WATER;
LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;
HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;
GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM,

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

CAST AND WROUGHT IRON GIRDERS, BRIDGES, AND ROOFS,

STEAM-ENGINE BOILERS, & GENERAL WROUGHT-IRON WORK.

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D. BRUCE PEEBLES & CO.,

ENGINEERS, WET AND DRY GAS-METER MANUFACTURERS,

BRASSFOUNDERS, & GAS APPARATUS MANUFACTURERS,

FOUNTAINBRIDGE WORKS, EDINBURGH.

SOLE MANUFACTURERS OF

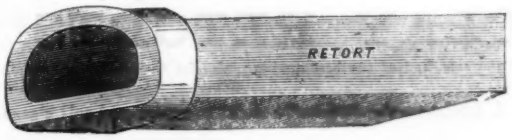
Peebles' Patent Wet and Dry Gas-Meters in Tin-Plate Cases, with Tongue and Groove Joints.

IMPROVED WET METERS IN CAST-IRON CASES.

STATION-METERS, GOVERNORS, EXPERIMENTING METERS, PHOTOMETERS, PRESSURE-GAUGES, &c.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.

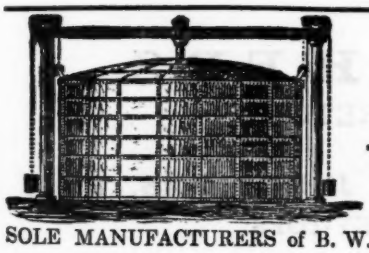


KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

Agent in Ireland—Mr. JAMES FURNESS, DOCTOR GARDENER STREET, DUBLIN.



IMPROVED GAS APPARATUS,

FOR CITIES, TOWNS, VILLAGES, &c.,

INVENTED AND MANUFACTURED BY

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD.

SOLE MANUFACTURERS of B. W. THURSTON'S IMPROVED SCRUBBER, CONDENSER, and WASHER, in use in many of the principal Gas-Works on the Continent.

PATENTEES of the IMPROVED COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

ESTIMATES, PLANS, and SPECIFICATIONS PREPARED for BUILDINGS and APPARATUS.

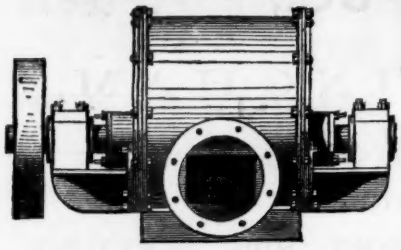
Prospectus, Price Lists, &c., on application.

LONDON OFFICES—57, GRACECHURCH STREET, CITY.

*** *Please address letters to Huddersfield.*

REFERENCES TO NEARLY 300 GAS-WORKS

BEALE'S GAS-EXHAUSTER IMPROVED.



FROM 250 TO 250,000 CUBIC FEET PER HOUR.

Since Mr. BEALE'S retirement, the Oldest Makers are

J. BURTON, SONS, AND WALLER,

MAKERS OF ENGINES, MACHINERY, and IRONWORK for GAS-WORKS.

Efficient and durable TAR, LIQUOR, and SYPHON PUMPS.

GAS-VALVES in stock, 2 inches to 30 inches.

SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever,

ROTATORY, TUMBLER, and CAPILLARY WATER DISTRIBUTORS for SCRUBBERS.

EXHAUSTERS from 3000 to 30,000 per hour in stock.

HOLLAND STREET, BLACKFRIARS, LONDON, S.E.

Between Blackfriars' and Southwark Bridges.

LAMBERT BROTHERS, WALSALL.

ALPHA TUBE & FITTING WORKS

E. J. & J. PEARSON,

DELPH & TINTAM ABBEY FIRE-CLAY & BRICK WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

ECONOMY IN GAS PURIFICATION. A PURER GAS AT LESS COST, AND GREAT SAVING IN LABOUR.

M'DOUGALLS' PRECIPITATED PEROXIDE OF IRON.

The above Oxide is now in use at some of the largest works in the kingdom, and has gained a decided preference, owing to its efficiency, cheapness, and the great saving in labour effected by its use.

It is a pure artificial Hydrated Peroxide, with an addition of only sufficient sawdust to give it the needful lightness or porosity to prevent pressure, and every particle is available for use.

In selecting an oxide, a point more important than its price, is to learn the cost of labour entailed in its use. Whilst at large works the cost of labour for purifying, where lime alone or the natural oxides are employed, is 2d. to 3d. per ton of coals, by the use of the above Oxide it is reduced to 1d. to 1½d., owing to the purifier's working so much longer when charged, and to rapid revivification—two points of special importance in the busy season.

For export to Foreign Works it is unequalled, every particle being available, and saves freight over less concentrated materials.

NOTE.—It is important to note that only the Hydrated Peroxide of Iron is useful, simple oxide being worthless. Inferior oxides show a large per centage of simple oxide, but very little Hydrated Peroxide.

M'DOUGALL BROTHERS,

LONDON—158, LEADENHALL STREET, E.C. MANCHESTER—68, PORT STREET.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

Possess special advantages for the prompt and efficient execution of large orders for

FIRE-CLAY RETORTS & FIRE-BRICKS,

Of every shape and size, and of the best quality; also for their *other productions* in Fire-Clay and Terra-Cotta, including their well-known White and Coloured GLAZED BRICKS.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Retorts in Fire-Clay.

Apply as above, or at their Offices,

3, WESTMINSTER CHAMBERS, VICTORIA STREET, S.W., or at 46½, QUEEN STREET, HULL.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

As Trustees of the late ORLANDO BROTHERS, we most respectfully announce that we intend to continue the above business, under the name of ORLANDO BROTHERS, in which name all communications must be addressed.

We trust that we shall receive a continuance of the same support which was given to our late father.

We are, yours most respectfully,

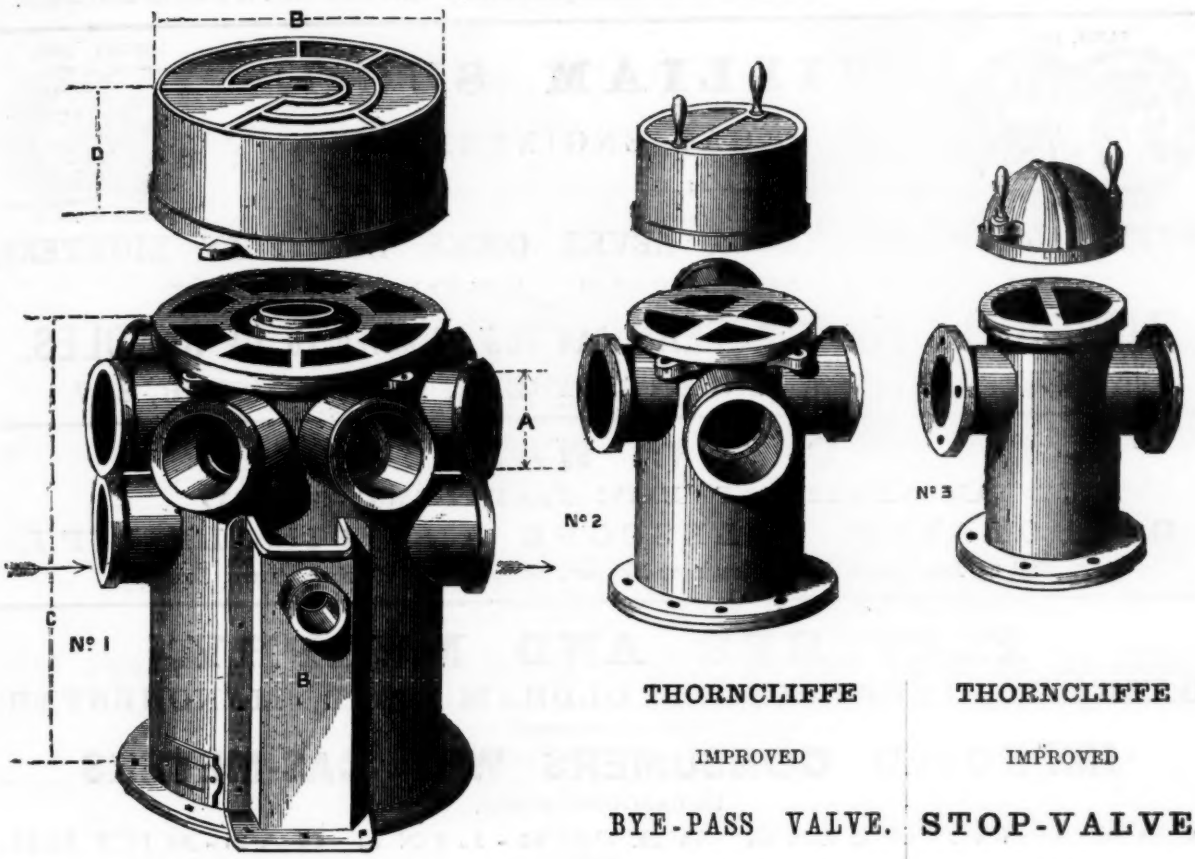
ORLANDO BROTHERS.
FRANCIS W. BROTHERS.
COLIN BROTHERS.

THE THORNCLIFFE IMPROVED CENTRE-VALVE,

MANUFACTURED BY

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.



Sizes of the

THORNCLIFFE IMPROVED CENTRE-VALVE.

		Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A	Bore of Pipe...	4	5	6	7	8	9	10	12
B	Diam. of Body.	16	20	23	26	28	31	34	40
C	Height of Tank.	33	35	38	43	46	48	51	56
D	Depth of Cover.	8	9	10	11	12	13	14	16
	Total height...	41	44	48	54	58	61	65	72

THORNCLIFFE IMPROVED BYE-PASS VALVE.

SIZES

From 3 ins. upwards.

THORNCLIFFE IMPROVED STOP-VALVE.

SIZES

From 3 ins. upwards.

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

These Valves may be made of any size to suit any position of boxes, to stand any amount of pressure, warranted and tested with gas before leaving the manufactory, prepared to work any number of boxes in rotation—say, two, three, four, five, six, or eight—and for all Valves above 12-inch ports a suitable rack-and-pinion movement is attached if preferred. These Valves (specially arranged) are applicable to inlet or outlet pipes of gasholder, to act as Bye-pass Valves to meters, governors, exhauster, condensers, scrubbers, washers, driers, and duplicate systems of hydraulic main; also to act as Stop-Valves on special mains about the works. Where it is important no impediment be offered to tar or ammoniacal liquor, the same having uninterrupted flow to the general tar-well on the works, and for which purpose the slowly changed, often disordered, and at all times obstructive Slide-Valve (challenging the best of them) is superseded by the exceedingly simple, instantaneously changed Dome-Top Valve, which also carries so marked an index, whether open or shut, at any distance from close observation, providing the Valve can be seen at all. See sketch in perspective, No. 3.

London Office—34, LONDON WALL, MOORGATE STREET, E.C.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

PARIS, 1867.

CLASSES 24 and 53.

WILLIAM SUGG,

GAS ENGINEER.

LONDON, 1862.

CLASSES 13 and 31.

PUBLIC LAMP GOVERNORS, LEVER COCKS, AND POLE LIGHTERS,

LAMP METERS AND BOXES.

LOWE'S JET PHOTOMETERS CAN NOW BE RATED TO 14 CANDLES.

VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

C. & W. WALKER

CONSTRUCT THE LARGEST SIZED

GASHOLDERS, TELESCOPE AND SINGLE-LIFT,

Midland Iron-Works, Donnington, near Newport, Shropshire; 8, Finsbury Circus, London.

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER;

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

And all kinds of Experimental Gas Apparatus.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

CELEBRATED SILKSTONE GAS COALS.

Analyses by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

Description.	Cubic Feet of Gas per Ton of Coals.	Illuminating Power in Candles.	Coke per Ton of Coal used. Cwt.	Ash in Coke per Cent.	Sulphur in Coa per Cent.
Best Silkstone . .	10,900	17·0	12·8	2·6	1·7
Norfolk Silkstone . .	11,000	15·94	12·5	4·4	1·64
Silkstone Brights . .	11,500	14·5	12·6	7·4	1·85
Silkstone Nuts . .	10,800	15·85	12·66	6·0	0·69

NOTE.—The illuminating power of the Gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

OFFICES, 34. LONDON WALL, CITY, E.C.

TANGYE BROTHERS & HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.;

And BIRMINGHAM (TANGYE BROS.), CORNWALL WORKS, SOHO.

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS.

Over 1000 of the Patent Retort-Lids and fastenings already supplied to the great works of The Gas Company at Beckton.

Several hundreds in use at the works of the London Gas Company.

FIG. 1.

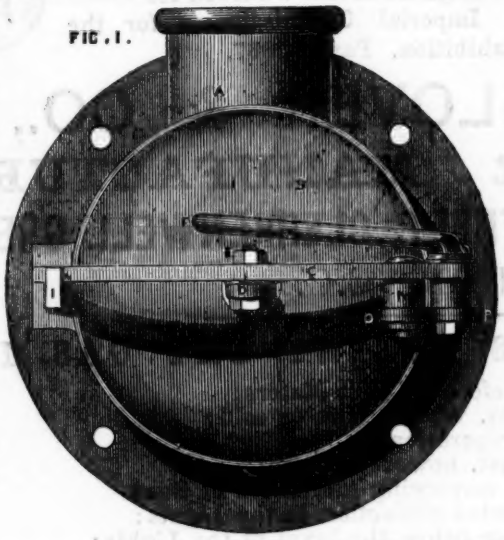
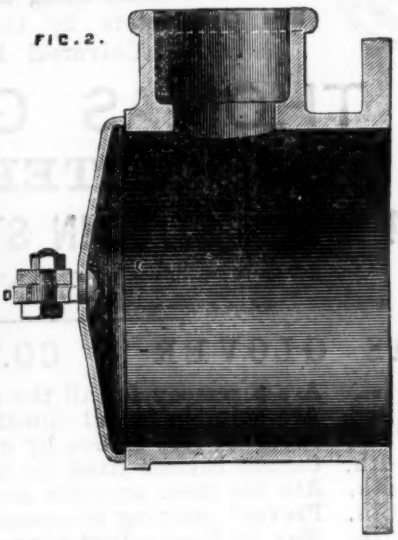


FIG. 2.



Adopted in the Gas-Works at

LIVERPOOL,
DUBLIN,
NOTTINGHAM,
ST. ALBANS,
BURSLEM,
BOURNEMOUTH,
WINDSOR,
BOSTON,
&c., &c.

THE "SPECIAL" STEAM-PUMP

IS THE

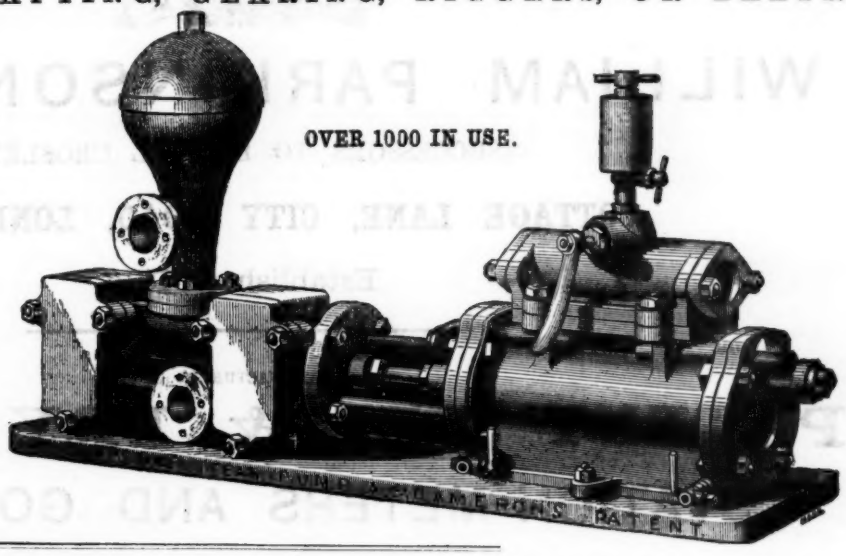
BEST PUMP FOR PUMPING AMMONIACAL LIQUOR, TAR, AND WATER IN GAS-WORKS.

The "SPECIAL" Steam-Pump is adapted for all ordinary purposes for which Steam-driven Pumps are used. It is economical in first cost, occupies very little space, and the wear and tear is reduced to a minimum, because there is absolutely no extraneous gear.

REQUIRES NO SHAFTING, GEARING, RIGGERS, OR BELTS.

Adopted in the following Gas-Works:—

Aylesbury Gaslight and Coke Company.
Alliance and Dublin Gas Company.
Bolton Gas-Works.
Burslem and Tunstall Gas Company.
Brighton Gaslight and Coke Company.
Bury St. Edmund's Gas Company.
Burnley Gas Company.
Bradford Gaslight Company.
Corporation Gas-Works, Stockton.
Chartered Gas Company, Westminster.
Cork Gas-Works.
Dewsbury and Batley Gas Company.
Dublin Consumers Gaslight and Coke Company.
Dunstable Gas-Works.
Imperial Gas-Works, St. Pancras.
Ipswich Gas-Works.
Kingston-upon-Hull Gaslight Company
London Gaslight Company, Nine Elms
Lewes Gas-Works.
Louth Gas Company.
Middlesbro' Gas-Works.
Northampton Gas Company.
Phœnix Gas-Works, London.
Richmond Gas Company.
Rio de Janeiro Gas Company.
Reading Gas-Works.
Shipley Gas-Works, near Bradford.
St. Albans Gas-Works.
Sutton, Southcote, and Drypool Gas Company, Hull.
St. Helen's Gas Company, Lancashire.
Windsor Royal Gaslight Company.
Wandsworth and Putney Gas Company.
Woolwich Equitable Gas Company.
Western Gas-Works, Kensal Green.



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IMPORTANT TESTIMONIALS.

Manager's Office, Local Board Gas-Works, Middlesborough, March 19, 1868.

Dear Sirs,—In reply to your inquiry, I beg to say that the "Special" Steam-Pump, which you supplied to these works some months ago, has been at work ever since for pumping tar and ammonia water. I like it well, and am more than satisfied, for I am really pleased with its mode of doing double duty.

I am, very respectfully yours.

JOHN DUNNING, Manager.

Messrs. angye Brothers and Holman.

Richmond Gas Company, Manager's Office, Gas-Works, Richmond, June 17, 1868.

Dear Sirs,—I have the pleasure in stating that the three "Special" Steam-Pumps which we have in use —viz., one for water, one for pumping liquor through the scrubbers, and the other for filling tar barges, &c., are working well in every respect, and, I think, cannot be too highly recommended.

Yours truly,

JAMES ELDRIDGE, Manager.

Messrs. Tangye Brothers and Holman.

Sutton, Southcote, and Drypool Gas Company, Hull, May 1, 1871.

Gentlemen,—In reply to your note No. 410, April 29, I am very glad to inform you, that in a few hours after I got the pump started, and after I had written you, it did its work beautifully, and has continued to do so, throwing one day 4000 to 5000 gallons per hour, although you say 3250 gallons is its capacity. It is a splendid pump, the best I ever saw, and has just emptied a tank 82 feet diameter by 16 feet deep in 100 hours. I should have written to you some days ago had your note come earlier.—Yours truly,

F. W. OLDFIELD, Manager.

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

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Paris, 1867.

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THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, OCTOBER 10, 1871.

Notes upon Passing Events.

New markets are one of the difficulties of London, as they are of every great town. Not only does the population increase, and the taste for luxuries or necessaries, according to modern notions, grow with what it feeds on, but railroads have revolutionized the modes of supply without touching the ancient market-places. At the present moment, Covent Garden is very much out of favour with market-gardeners, and with good reason. To begin, it is the property of a noble personage, who, living in seclusion, is entirely without the pale of public opinion. The Duke of Bedford vegetates in a world of his own, and is not the least affected by the most virulent newspaper criticism. But if he were, it would not much mend the matter, because his interests as a landlord are opposed to the interests of the market-gardener. Owner of a large property in and round Covent Garden, it does not seem to be generally known, but it is, nevertheless, the fact, that the Bedford estate would be benefited if not another load of cabbages, turnips, carrots, or onions were ever brought into the market again, and if the whole market space were left available for shops of fruit, flowers, and the more costly and delicate class of vegetables. As it is, nothing can be worse than the arrangements for London consumers. To begin. There is insufficient accommodation for the market gardeners waggons; during the night all the avenues are blocked up by people competing to unload. At five or six o'clock in the morning the police order away all that are not unloaded. These unfortunates must find standing somewhere, at considerable expense, and with the certain deterioration of their vegetables. So that the owner of the market waggons does not know, until he arrives in Covent Garden at eight o'clock or any other hour, whether or not his produce is for sale that day. The retailers outside the covered avenues are in a still worse plight when the weather is either wet or intensely hot. Again; railways not only bring a good deal to the vegetable markets, but take a good deal away. The manufacturing districts and the great seaports draw largely on London for their vegetable supplies at certain seasons of the year. There is very little doubt that the managers of the Duke of Bedford's estate would be glad to make an arrangement with the Corporation of London for surrendering all the vegetable trade to a new market, so as to be able to confine Covent Garden to fruit, flowers, expensive asparagus, peas, cucumbers, mushrooms, and celery out of season! There is a talk of reviving Farringdon Market, which has always been a failure, because it was planned without consulting the people who understood the trade. There was never convenient access to it for the market waggons. A load of cabbages—which are a very representative vegetable—should be carried straight, with only one unloading, from the field where they grow to the wholesale market. Farringdon Market would not allow the waggons to go to the spot for sale. Porters were required, and hence extra expense and incalculable damage. The new vegetable market should not be farther east than can be helped. It should be crossed with streets, admitting at least two lines of waggons to come in under cover and turn. It should be connected with a not too distant central railway station by tramways, on which trucks bringing or sending away vegetables could be moved by hand or horse power, and unloaded or loaded. It must be remembered that the Garden draws its vegetable supplies from many quarters. From the west, beyond Chiswick and Twickenham, and the fat valley of the Thames; from the Surrey side not yet invaded by the bricklayer; largely from Essex, and, to an important degree, from Bedfordshire and the north-west. There is also the sea-borne supply from Cornwall, the Scilly Islands, the Channel Islands, France, Belgium, the Rhine, and Portugal. All these sources of supply should be considered when founding a new market to supersede Covent Garden. But, if well considered, the Corporation of London may make a good speculation. Let them study the arrangements that have made Billingsgate, in spite of its deficiencies of access, so successful. Let a cargo or a van load of fish come at what hour it may to Billingsgate, and it is always lawful to sell; but the greengrocer or costermonger who has sold out will find no second supply at Covent Garden. There is another important point—to secure financial success. There must be no waste in building. The key-note should be a light and lofty roof supported on iron pillars, paved or asphalted, and surrounded by an iron fence—a sort of gigantic bird-cage. Unfortunately, the committees to whom these undertakings are committed are too apt to consider their dignity increased by a very costly building. Indeed, for a specimen of money wasted under the influence of an ambitious and thoroughly unpractical architect, we have only to turn to Columbia Market, where a quarter of a million expended has produced results which are simply ridiculous. On the foreign market at Deptford the Corporation promised to spend £160,000. For whose benefit? Certainly not the meat trade, the consumers, or the Corporation.

The continued extension and working of the tramways convinces every impartial observer that their only limit will be their profitableness, and that the convenience they afford the public is so great that they must eventually overcome all opposition, which, however, is not altogether unreasonable. Tramways are a nuisance to light private carriages in many ways, and not least by substituting pavement for macadam. They divide the traffic, which is both an advantage and a disadvantage; but, when they once make their way into the heart and across the City, no long time will elapse before they are used at night as well as by day—by day for passengers, by night to convey heavy goods from the railway stations, and garden and agricultural produce to the markets. It will be so easy, by arrangement with the owners of the tramway, to fit road carriages to the trams, or to place them on trucks constructed for the purpose. A very moderate market-garden will employ from fifteen to twenty horses. To reduce these to five or six is a saving too important not to deserve some trouble and consideration. Another still more important improvement will follow the demand. It is very properly illegal to run locomotive engines in crowded thoroughfares, or even on common roads, without extraordinary precautions; but, if tramways come into common use in our large towns, the ingenuity of mechanics will be turned to inventing a locomotive of five or six-horse power that will neither annoy with smoke nor alarm with noise. The cost of maintaining and keeping up the stock of horses required by a tramway is something very serious.

Mr. Bailey Denton, in two letters, occupying four columns of the supplement of the *Times* (which have since been the subject of a leading article in that journal), has endeavoured to impress on municipal authorities and Boards of Health the only sound principles on which they can safely, at the least expense, with the utmost profit, get rid of their sewage. Now that it has been made illegal to get rid of sewage by polluting and poisoning the nearest running stream, this has become a pressing practical question. We will therefore endeavour to make the common sense of the question plain to our readers in something less than four columns of a full-sized daily newspaper. We say the common sense, because, when any work is to be executed, some man of agricultural experience in sanitary works must be called in. The idea of applying sewage profitably for agricultural purposes is certainly due to the Blue-Books of the first Board of Health. But as, unfortunately, the sanitary pope who issued these dogmatic decrees had neither the experience of an engineer nor of a farmer, the directions for using liquid sewage were all absolutely wrong, and the calculation of profit worthy of a mining agent. To intersect a farm (as Mr. Mechi did at Tiptree, when he knew no better) with iron pipes, and use a steam-engine to distribute in showers through a pipe and hose, on the principle of a fire-engine, is simply to waste a very large amount of capital in doing a good thing in a very bad manner. It was in consequence of the total failure of a number of farms established by amateurs on the plans of the first Board of Health, that sewage cultivation went completely out of favour, and was treated with the greatest contempt by practical farmers who have adopted with enthusiasm the many novelties that have been introduced into agriculture within the last quarter of the century. The immense incomes realized by the manufacture of artificial manures have tempted a great many ingenious men to endeavour to extract a saleable portable manure from the contents of our sewers. What may be the future of chemical discovery no man can say. But up to the present moment we can safely assert that chemistry has done nothing to solve the sewage nuisance question, although the promoters of chemical patents have done a considerable business on the Stock Exchange. If, in the course of the next twelve months, we find the A. B. C. or any of the native guano companies engaged in selling tens of thousands of tons of portable manure at a profit, we shall be prepared to give the manufacture a degree of notice which it certainly does not deserve at present at the hands of people who want to get rid of a nuisance or to grow crops, and not to job on the Stock Exchange. The Rev. Henry Moule has done good service by bringing to the front, plans for using the deodorizing power of dry earth. Mr. Moule is an enthusiast, or he would not have done all the good he has, and his plans, involving no elaborate machinery, have done no harm, even where unsuitably applied. In farmhouses, in cottages, in villages, and in mansions, as well as in hospitals and workhouses, where gardens are attached. The dry-earth closets may frequently be advantageously employed in preference to water-closets, and always in preference to the common open privy. But for the success of the system it is essential that in every house there should be at least one person who will make it her or his duty to see the system properly carried out, and that in a village, however small, one competent man of intelligence, and of a positive despotic character, should be appointed head scavenger. Every agricultural labourer ought to have a garden, if not an allotment, and the proper use of dry earth would make the labourer's family almost as useful to him as a pig. As for the idea of introducing the dry-earth system into great towns, we look on it as only one degree less troublesome than open privies and cesspools. To introduce the dry-earth system, and expect it to be properly worked out by the average British housemaid, or the average British cottager's wife, is out of the question. But its use may be taught in village schools. The principal towns of this country are supplied with house-to-house water, water-closets, and sewers to carry the inevitable sewage away, which consists of the many slops of bed-rooms and kitchens, as well as of the contents of water-closets. It is now ascertained that the mode of getting rid of sewage at the least expense, and, under favourable circumstances, at a profit, is to apply it to the irrigation of land. But in the first place this land must be prepared in a suitable manner for its reception. That preparation, above all, consists in thorough deep drainage, except in the very rare instances where the soil itself is a natural filter-bed. The experience of a sewage farmer is required for selecting and dividing the areas, for settling the amount of sewage which the soil will bear at each season, and also for deciding on the crops which, looking at the available markets, may be most profitably grown. It may happen, from the situation of a town, that it would cost more to pump and convey to suitable ground than can possibly be repaid by the crops. It will then be a question of not with how much profit, but of with how little loss the sewage may be disposed of. But if crops are to be grown with any chance of profit, and if the sewage is to be deprived of its noxious qualities, it must not flow over the land like a water meadow, *but through it*. To produce the necessary quality of soil, deep cultivation is generally essential. This may sometimes be done by horse power; but, as a rule, steam cultivation will be found much more effective and economical. There is, however, no royal road to success in sewage farming. It may be taken as certain that the very worst advisers are the engineers recommended by the Board of Health Department; for the very simple reason, that they never consider the question of profit and loss. For a specimen of works laid out on a scale of useless extravagance, we have only to go to Tunbridge Wells, where Mr. Rawlinson, C. B.'s, pet engineer, Mr. Lawson, has effected his purpose regardless of the pockets of the ratepayers. Mr. Bailey Denton is one of the few men who bring agricultural and engineering experience to bear on this pressing public question; but for those who wish to see a sewage farm laid out with the view of obtaining the best results at the least expense, we recommend a visit to Mr. W. Hope's market-garden farm (Britten's Farm), near Barking. Mr. Hope, unlike most men of his calibre and scientific training, has put himself, as it were, to school with practical cultivators, and has kept steadily in view the profit question. His many inventions connected with the application of sewage are simple, inexpensive, and effective.

It is a significant sign of the times that the President of the Social Science Congress now sitting at Leeds—Sir John Pakington—should place himself in the van of educational reformers with all the zeal of a convert. Sir John Pakington is in the 73rd year of his life. He has been 34 years in Parliament, and passed through all the phases of Ancient Tory, Peelite Conservative, Disraeli Conservative, until at length in a green old age he has blossomed into an advanced Liberal on all except political and ecclesiastical questions. Whether it be true or not that our working men are in the frightful state of inferiority, as regards the mass of continental workmen, depicted by Sir John Pakington, is a matter of no consequence. On such a subject a little exaggeration will do no harm. There is no fear that our fellow-countrymen or fellow-countrywomen will drink too deeply of the streams of learning provided by the State, or the wells of learning opened up in old neglected, misused endowments. There are people like grooms, who look on water as the poison of horses, and learn with many protests that if water is always within reach of a horse he will never drink too much. Dr. Temple, Bishop of Exeter, states, from his large experience as a schoolmaster, that about three boys in a thousand run without apparent effort from the lowest to the highest classes of a great school; and we are not likely to find a higher per centage amongst the children of labour, to whom it will pay to pass at 13 years of age from a primary to a higher school, in order to receive a first-class education. Therefore it is not probable that the resources of our reformed endowed schools will be over-taxed. But the President of the Social Science Congress also touches on the great dwelling question in a spirit with which the most advanced Socialist can sympathize. We admire Sir John's sentimental idea, but Mr. Odger himself could not be more unpractical. Sir John seems to forget that this country possesses the institution of country gentlemen and landowners, whose patriarchal duties must be exhausted before "the State interferes." The patriarchal duties are the *raison d'être* of the English landed squire. Sir John, with Spitalfields in his eye, calls on the State "to "rescue families of workmen from the dismal lanes, crowded "courts, and noisome alleys of our towns, and plant them in "the clear." And he goes on to take as example Switzerland, where "skilled workmen and even factory labourers mingle "with and are part of the independent peasant proprietors." To begin with the single captive, the Spitalfields weaver—created by persecution, rocked, dandled, and dry-nursed by protection—he ought long since to have been improved out of existence in the miserable district where, tempted by the amusements of town, he works and starves on wages eked out by poor-law assistance and a host of mischievous charities and doles. The city of Antwerp was once famous for its black silks, but as the weaver was not tempted by charity or poor-rates to continue an unprofitable trade, one or two weavers only remain to manufacture, for passing travellers, a few silk dresses at fabulous prices. The Swiss weavers, watchmakers, and factory hands, who are also peasant farmers, were landowners before they became commercial workmen. They began by filling in the long hours of winter, which cannot be applied to the farm or the dairy, by indoor work. Were it possible to remove any number of our Spitalfields and Clerkenwell workmen to a cottage and minute farm on Woking Common, they would refuse the offer for much the same reason that impoverished actors have declined the cruel exile of the Dramatic College. But Sir John Pakington's declaration is valuable from so true a representative of country gentlemen, because he may now be relied on for assistance in making cottages, with gardens, pig-

sties, potatoe ground (freehold or leasehold), more plentiful and less legally costly to the agricultural labourer. At agricultural meetings we hear of a cow's grass—not as a necessity for breeding healthy children, but "as a reward for good conduct!" We do not believe in an agriculture, prosperous, progressive, and, above all, meat-producing, in a community of cottage farmers; but, on the other hand, unless a great deal more is done than has been done to make agricultural labourers independent and contented, by placing the only savings bank they really understand—land—within their reach, the mischievous migration of unskilled labour to towns will increase from year to year. The system must be rotten that makes the workhouse the natural expected end of the days of a worn-out agricultural labourer.

The question of the town labourer stands on quite a different footing. Town dwellings, if unhealthy, insufficiently drained and supplied with water, are the sins of the governing body, parochial or municipal. How much some are inclined to neglect their duties we showed the other day, in the case of St. Bride's and its Spitalfields property. Pauperism is the cancer of towns—pauperism carefully cultivated by the encouragement of drinking-shops, the discouragement of resorts where amusement is to be had without beer or spirits, a lax and foolish system of indiscriminate poor-law relief, and the competition of religious and other charities. Mr. G. W. Hastings spoke, with much force, on the cultivation of pauperism, one of the subjects in his address as chairman of the Social Science Council:

It will be much nearer the truth to say that a poor-law became necessary, not because monasteries were abolished, but because they had previously existed. It was the vicious system of doles and indiscriminate charity, virtually a system of out-door relief, profusely administered by religious foundations in every city and county of the land, which bred those swarms of sturdy beggars, and created that rush of pauperism which frightened our forefathers into stringent legislation. The sound principle laid down by the statute of Elizabeth was that relief was only to be obtained by equivalent labour, and that industry, not idleness, was the just object of protection. But, as generations went on, that principle was lamentably neglected, till the poor-rate came to be regarded as a fund on which improvidence and laziness might draw at pleasure. The flood of pauperism rose so high that it threatened to swamp the savings of industry. I heard Mr. Barwick Baker say not long since, at one of the conferences of guardians, which he originated and still conducts, that in 1831 the rates of a parish in which his property is situated had risen to 18s. in the pound on the actual value of the land. Once more roused by the imminence of its peril, the nation gave its assent to the new poor-law system, based on the workhouse test, as the absolute condition of relief. Had that salutary measure been unflinchingly applied, I venture to assert that we should not have been at this day debating on the causes of pauperism. Pauperism would have been crushed out with a stern and wholesome hand, and the industrious and provident been relieved of the burden under which even the wealth of England is ready to stagger. But laxity of administration has once more been suffered to prevail, and once more the flood is rising round us. It is not, as is often most untruly said, that the new Poor-Law Act has failed, but that its vital principle has been abandoned. In-door maintenance was to be the rule, out-door relief the rare exception; but in many unions the principle had been reversed. . . . All beneficent laws press hardly in some individual cases, and it is probable that a rigid rule of in-door relief may occasionally work hardly. But we must remember that, though hard to a few, it is just and merciful to the many. It is not hard on the ratepayers who, as the producing part of the community, have a claim to the first consideration. It is sometimes, indeed, objected that the taking of a whole family into the house, when a little help, as it is termed, would keep them outside, is uneconomical. I should doubt the accuracy of these cases, but, taking them as true, what if the compulsory entry of one family into the house keeps three others off the rates; is that uneconomical? Nor is it really hard on the people themselves who are the subjects of such a rule. It never can be anything but kindness to force on a man the blessing of self-exertion, and all who have administered the poor-law must know the fatal readiness with which those hovering on the brink of pauperism believe that they cannot earn a living, and the marvellous way in which, if the test be firmly applied, the means of subsistence will be found somehow. *Nor, again, let it be forgotten that the fewer paupers there are to keep, the greater the wage-fund to be distributed among industrious workmen. Every shilling eaten up by the rates is so much subtracted from the prosperity of the weekly wage class.*

The last paragraph cannot be studied too carefully by the working men who aspire to independence. Every shilling of poor-rate levied to support paupers in idleness is so much taken from the common fund available for the employment of labour. The most unproductive expenditure is that levied on capital for the purpose of supporting idle hands. Again, Mr. Hastings's concluding words are important, when eloquent ignorant theorists, like Mr. Carlyle and Mr. Ruskin, talk such well-meaning nonsense. When Mr. Carlyle called political economy "the dreary science," he might just as well have called anatomy "the bloody science" or "the "disgusting science."

In conclusion, let me urge the necessity of cultivating a scientific spirit in dealing with social questions. Wanting that, we are like a ship adrift at sea without a rudder. Science, which in all the ramifications of its pursuits means the reduction of knowledge to accurate form, is the peculiar safety of the legislator, pushed on as he is by blind impulses, and shackled by conflicting interests and the jar of faction. Its value to mankind is well attested by the virulence it awakens in opposite quarters. Science is honoured by the hate alike of those who would return to mediæval superstition and of the party, not less fanatical, who would submerge civilization in a sea of blood. It is, in truth, vituperated by all who find the reality of facts inconveniently in their way. Thus it is the fashion of some, as I have shown in regard to the poor-law, to call political economy hard. They speak of it as if it were an active agent in the injuries they suffer or fancy. A few years ago some London workmen, when warned of the unwisdom of their proceedings, replied, "If political economy be against us, we will be against political economy." As well might a man exclaim, who had fallen from a ladder and broken his leg, "If the law of gravitation be against me, I will be against the law of gravitation." Political economy, like astronomy or chemistry, or any other science, does not create facts, but expounds them. In that sense political economy may be hard, for it tells us of hard facts, of realities which nothing can disannul. It is, in truth, only the rules of common sense and of business experience applied to communities of mankind. Nothing can prevent individuals who are thoughtful and industrious getting the better of the improvident and idle, and nothing ought to prevent it. Nor can anything hinder a nation or a society, wise enough to obey the laws of nature in their trade, from becoming more prosperous than those who hamper the growth of their own success by artificial restrictions. Political economy explains these things, and teaches what disasters will follow the defiance of natural principles; but the disasters are not therefore its creation.

Circular to Gas Companies.

In compliance with the suggestion of a correspondent, that we should complete the interesting analysis of the accounts of the metropolitan gas companies by a statement showing the quantities of coke, breeze, tar, and ammoniacal liquor produced from each ton of coal carbonized by the several companies in the year 1870, as given in the return presented to Parliament, we have had the following table calculated, which gives the desired information. It must, however, be stated that a bushel of coke in London is not a uniform quantity, but varies from 38 lbs. to 42 lbs. in weight. Nor is the strength of the ammoniacal liquor given in the returns. The table, however, imperfect as it is, affords an interesting supplement to the analysis of the accounts we have previously published:—

TABLE *of the Products per Ton of Coal carbonized, realized by the Metropolitan Gas Companies in the Year* 1870.

Name of Company.	Coke per Ton of Coals, in Bushels.	Breeze per Ton of Coals, in Bushels.	Tar per Ton of Coal, in Gallons.	Ammoniacal Liquor per Ton of Coals, in Gallons.
CHARTERED. . . .	21·86	2·60	9·32	18·77
COMMERCIAL . . .	25·76	3·63	8·31	13·78
EQUITABLE	26·07	2·56	10·85	22·86
IMPERIAL	26·63	4·05	8·38	13·52
INDEPENDENT . . .	20·45	1·14	9·70	13·08
LONDON	29·36	3·21	9·24	12·08
PHŒNIX	28·67	1·80	9·67	17·80
RATCLIFF	23·58	2·79	8·96	19·55
SOUTH METROPOLITAN.	24·66	5·10	9·07	17·38
SURREY CONSUMERS .	24·81	1·58	7·45	11·28
WESTERN (cannel only)	8·18	7·46	12·16	12·43
Average. . . .	24·44	3·33	9·14	15·60
Average, excluding Western Co. . .	25·28	3·12	8·99	15·76

By a slip of the pen, it was stated in our last that the illuminating power of the cannel gas supplied by the Chartered Company for 5s. 5d. per 1000 feet was 20 candles. This was an error, as the minimum illuminating power of this company's cannel is fixed by the Act of 1868 at 23 candles. We may add here that the qualities of the gas, as stated in our last as being supplied by such company, were in general the minimum statutory qualities; but it is well known, from the published reports of the local gas examiners, that the qualities are almost invariably above, and in most cases considerably in excess of these minimums. Although several companies are still under the Act of 1860, which prescribes a minimum illuminating power of 12 candles, it is rare to find a gas in the metropolis under 14 candles.

In addition to the reduction of price of 3d. per 1000 feet announced by the Ratcliff Gas Company to take place at Christmas next, we must mention that the Crystal Palace District Company announce a reduction to 4s. 2d. after the same date. The price of the Commercial Company's gas was reduced to 3s. 9d. from Midsummer last. These reductions of price, and coincident supply of a rich gas, are made by the spontaneous action of the companies, and exhibit a praiseworthy determination to give their customers all the advantages of improved production and extended markets consistent with a due respect for their own statutory rights.

The President of the Board of Trade has reappointed the gas referees for another year. From a report of the last meeting of the Court of Common Council of the City of London we learn that the Special Gas Committee of the Corporation have been urging upon the Board of Trade and the gas referees the advisability of at once fixing a maximum for the sulphur impurity in gas. The reply was similar to that made to the Metropolitan Board of Works last year—viz., that the referees were making experiments on the matter, and hoped very shortly to be able to fix a maximum of sulphur allowable. The public are impatient simply because no limit has been decided upon, when it would have been as easy to fix a provisional maximum for sulphur as for ammonia. In their instructions for the winter months, just issued, the referees have reduced the maximum amount of ammonia to be allowed without liability to penalty to 2½ grains in 100 cubic feet, and they have again ordered that the quantity present shall be estimated. Although we know it is quite easy to remove all ammonia from gas, and believe it would in general be to the profit of gas companies to remove it, we think it undesirable to fix a much lower maximum than that now decided upon, considering

that any excess renders a company liable to a fine of £50 for each day the excess is present. Ammonia is a comparatively harmless ingredient in gas, and the mischief it does is mainly to the disadvantage of the companies. It would be much better, then, to fix on a reasonable and quite possible limit, than to have the chief gas examiner frequently called upon to say whether an excess was or was not occasioned by unavoidable cause or accident.

The York Gas Company have, we are informed, rejected an offer made by the York Town Council to give them £215,000 for their undertaking, the paid-up capital of which is £95,000. The sum offered, it will be seen, amounts to twice the amount of the paid-up capital, with a bonus of £25,000, and represents the full market value of the shares. One consequence of this failure of negotiations we expect will be the reintroduction to the House of Commons of the Municipal Corporations (Borough Funds, &c.) Bill as soon as Parliament meets again. The desire of municipal bodies to absorb gas undertakings seems to increase in intensity, for we hear of five or six other gas companies who have had offers made to them by local authorities, but as yet without much prospect of terms being agreed upon.

The passion for acquiring gas undertakings we have just mentioned, may possibly be stimulated by the knowledge that the Corporations which have recently purchased gas-works appear to be as flourishing as gas companies. Dundee, in spite of the £40,000 paid for parliamentary and arbitration expenses, has reduced the price of gas from 5s. 4d. to 4s. 2d., and still has a surplus of £1662 for the year ending the 30th of April, 1871. In Glasgow, also, a reduction has been made from 4s. 7d. to 4s. 2d. (without meter-rents), and the Corporation have still a surplus of £6587. We have not yet received the Leeds accounts, but we are informed that they show a profit of £6000 on the first half year's operations. The Manchester accounts for the year ending the 24th of June last show a gross profit of £79,322, reduced to £28,020 by the payment of interest and money appropriated to the liquidation of the mortgaged debt.

We publish in another column a letter from the secretary of the Patent Gas Company in reply to some observations we made in our last "Circular." It is, of course, no wish of ours to depreciate the value of any *bonâ fide* invention, and it will gratify us as much as any one if Dr. Eveleigh or anybody else can produce 20-candle gas from ordinary gas coal, without the aid of cannel, the price of the gas at the station-meter being quite as little as the poorer gas made by the processes now in use. We will go further, and declare any invention which fulfils this promise a most valuable one. We shall, therefore, look forward with much interest to the results obtained at Barnet, where a practical trial will be given to the invention, which, so far as we know, it has not yet received. We shall immediately make ourselves acquainted with the contents of Dr. Eveleigh's last specification, and let our readers know in what respect our description of the process was defective.

We have received a copy of an address delivered before the New England Association of Gas Engineers, on the 25th of July last, by W. W. Greenough, Esq., president of the Boston Gas Company, which we have read with much pleasure. The author is justly proud of the position which the manufacture of gas holds in the United States, but scarcely endorses the opinion of one of his countrymen who believes America to be fifty years in advance of Europe in our speciality. He is careful to point out how much still requires to be learnt before the manufacture is properly understood. The apparatus of the gas-maker may be nearly perfect; but, when every step of the whole process is passed in review, it will be found that science has hardly yet passed the threshold of its labour. We have, the author points out, still to learn what is the true heat which extracts from coal the largest amount of the highest grade of gas it is capable of producing. There is no pyrometer of easy and ready use which shows us the absolute heat of our retorts, the evenness of its duration, or the possible variations of temperature, and which might exactly indicate how the best results are to be attained. Then, as regards condensation: "Over-condensation is as injurious to the grade as under-con-"densation is to the purity of the gas. How shall the engineer "practically ascertain what he ought to take out by the process, "and continue to stop there day and night, summer and winter?" And further, as regards purification, how little exact knowledge have we of what takes place in the purifiers, except with one or two ingredients. These are points Mr. Greenough mentions as deserving the serious study of gas engineers and chemists.

The weak point of metropolitan illumination is undoubtedly the lighting of the streets, and no one compelled to traverse these after the shops are closed, or to wander in suburbs where no shops exists, can fail to be impressed by the unsatisfactory nature of the illumination afforded by our ordinary street-lamps. It is somewhat remarkable that so little has been done with these in the way of improvement. Some changes in form have been made—the introduction of a bull's-eye has been tried—but the ordinary street-lamp still remains what it was fifty years ago. The last invention, which promises to make a great improvement in the appearance of our streets, is the catoptric lamp invented by Mr. Skelton. One side of Waterloo Bridge is now lighted by these lamps, the old lamps being retained on the other side for the sake of comparison. It would have made the comparison fairer if new burners had been supplied to the old lamps as well as the new; but, in any case, the superiority of the light given by the catoptric lamp is so great that the difference would be instantly recognized. The fact is that in the old lamp at least one-half the light afforded by the gas-flame is wasted, so far as the passengers in the streets are concerned. To remedy this, Mr. Skelton fixes at the top of the sides, and on the crown of the lamp, slips of silvered glass, set at an angle, which reflect the light downward, and distribute it so well, that on Waterloo Bridge it is almost possible to read from lamp to lamp. We only fear that the expense of the lamps will interfere with their general introduction.

Correspondence.

EMBEZZLEMENTS ON THE BIRMINGHAM OLD GAS COMPANY.

SIR,—It appears difficult to prevent fraud where a secretary and two or three collectors or other officials conspire to carry it out. Therefore it appears necessary that the secretary should be a man of known high probity and integrity, and that he should not be grudged a very liberal salary, so as to render the loss of his position a serious consideration. It appears very impolitic that the board have determined upon not prosecuting the remaining defaulting collectors, and have even resolved upon continuing their services. It seems like a direct premium to these men, and to their juniors, upon their committing another fraud. Again, it seems hardly politic to sweep away the entire fund reserved to meet these defalcations arising from neglect. It would seem more desirable to withhold any dividend (even only a 9 per cent.) to make the proprietors feel "where the shoe pinches," and so to put a "screw" on the board to prevent such defalcations taking place in future. Besides, what are the uses of auditors and directors if they do not look at their balance-sheet and inquire why they have £25,000 arrears of rental, when they might and ought to know that they should not have £1000? The Michaelmas quarter's rental of this company should be £13,000, on an entire *year's* rental of £76,000. The arrears uncollected on the former sum on the 23rd of December should have been £365. It was (together with embezzled coke accounts) £26,080 (see JOURNAL OF GAS LIGHTING, vol. XX., No. 483, April 11, 1871, Phœnix balance-sheet, "Arrears," Dec. 23, £913 on £208,000, year's rental).

Many companies never exhibit a balance-sheet to their proprietors (see Commercial Gas Company, and formerly Great Central Gas Company). I believe many boards never see a balance-sheet—even if the books are ever balanced. Think of that, ye merchants and wholesale dealers who "take stock!"

A professional accountant is a "delusion and a snare," as his appointment throws off suspicion, and is evidently in recent cases perfectly futile.

In regard to checks upon the integrity of the collectors, an application should be sent from the office (unknown to the collector) for the arrears appearing to be due from each consumer. The current quarter's account should be sent in from the office (independent of the collectors), and a few applications should be made from the office for even the *current* quarter without communicating with the collectors.

I strongly recommend the payment of the collectors by commission (instead of a fixed salary), subject to fines for arrears uncollected and bad debts made; this commission varying from 1½ to 2½ per cent., according to seniority of collectors and district to be collected. Fines on arrears and bad debts, 10 per cent. Thus—Consumers, 2000; *year's* rental, £20,000; arrears uncollected at the end of *each quarter*, £100 (four times per annum); bad debts made in the *year*, £200; *net* earnings of the collector varying from £200 to £400, according to seniority. The collectors should be appointed as young men, devoting their whole time to it, of sound honesty, giving two *personal* sureties for £1000, very civil, and not of irritable temper, and, if possible, possessing some little property. The system of payment creates a competition *furore* among seven or eight collectors, so that each one strives to have the *lowest* arrears and bad debts, thereby earning more income for himself, and also thereby rendering embezzlement (with consequent heavy arrears) very difficult. I strove for ten years unsuccessfully to introduce this system to the Phœnix *old* board, and should have never succeeded but for the number of small embezzlements (say from £200 to £400), and for the temporary absence of a calcitrant director; and now, after 22 years of trial, scarcely an embezzlement has occurred, and I believe the Phœnix *new* board would not return to the old plan of fixed salaries upon any consideration. This plan has saved the Phœnix thousands upon thousands, besides probably embezzlements to the amount of £140,000 (at Higgs's proportionate rate).

Redpath's and Robson's forgeries of stock should have been detected by the accountants, as the latter had to calculate dividends upon *false excessive* stock. The fraud of a quarter of a million on the Union Bank would have been discovered if any head official of that bank had condescended to agree with the Bank of England their balance at the end of each quarter.

Sutton, Surrey, Oct. 2, 1871. CHARLES PRIDDEN.

REDUCTION OF SUNDAY LABOUR IN GAS-WORKS.

SIR,—The interest created by the letter of your esteemed correspondent, the engineer of the South Metropolitan, in your last issue, on "Sunday Labour in Gas-Works," is most encouraging.

I believe the practicability of the question has been long ago decided in certain provincial works, and recently in the metropolis; but, unfortunately, its adoption has not generally followed, insufficient plant, want of storeage, and a laudable desire among managers to work as economically as possible, militating against this very desirable movement.

It may be impossible to rigidly carry the principle into operation, many contingencies being likely to occur, the variable character of London weather, for instance, occasionally necessitating incessant manufacture in order to keep up the supply, or to increase the stock; but, generally speaking, most works can do something towards a material reduction of Sunday labour.

Surely the necessities of modern *progressive* civilization do not demand an army of stokers to labour on the Sabbath, rendering them callous and indifferent to their mental and social advancement, and the blessed advantages of a Sunday's rest.

Where, however, it may not be desirable to change gangs weekly, or to suspend the manufacture for 24 hours each week, the 12 hours "hold on" may still be adopted.

Assuming the "change" is monthly, which seems to be the period generally adopted, and most in favour, the day stokers could leave work on Saturday evening, returning to work at the usual time on Monday morning, having had in the interim 36 hours rest, the night stokers working as usual through the month, changing-day bringing the same advantages to them.

By these means each man would gain 26 days, or nearly a month's rest in a year, the settings being slow-fired but 12 hours a week.

In a commercial aspect it is a mistake to work men all the year round. Physically, men cannot endure 365 days stoking in a year. It is too much—flesh and blood can't stand it.

It is obvious the men who labour every day in the year must be physically inferior to those who take 52, or even 26 days rest out of it, and it is as much to the interests of the masters as it is advantageous to the men, that their moral and physical standard should be raised.

Bad makes of a Sunday being, as a rule, proverbial, it follows, if men are allowed to recruit their strength on Sunday, they will be in a better condition to encounter the six days toil, to the corresponding improvement of the carbonizing statement and returns.

Apart from any religious view of this question, it is a movement, in my opinion, calculated to produce the most beneficial results. The social, moral, and intellectual amelioration of the operatives of gas-works will be most favourably influenced, while the material interests of the companies will suffer the reverse of deterioration.

Chartered Gas-Works, CHARLES EDWIN JONES.
Horseferry Road, Westminster.

SIR,—The word of encouragement which you have always had for those who have been endeavouring to lessen the amount of Sunday labour in gas-works, and a fear that your remarks in last JOURNAL may tend to harm the movement, in the case of those whose storeage is rather short, must be my excuse for asking, for the first time, space for a few words in your next impression.

Mr. George Livesey's letter, published in your last, gives a very simple statement of the way in which the twelve hours stoppage is accomplished at his own and other of the London works, and I think should be an incentive for others to follow the example thus set; and I wish to endorse his statement, that the *only* thing wanted *in the way of plant* is a few extra retorts. What is most wanted is the will to carry out a plan when once it is devised. When the subject was first broached, it was at once said, "It is a question of storeage;" but on more careful consideration it was found that it really was not so, and was more a matter of retorts. The report of the committee appointed by the British Association of Gas Managers to inquire into the question, which is published in the JOURNAL of July 4, 1871, p. 513, speaks of the want of gasholder room as one of the chief "supposed difficulties," and asserts that "the real question is one of retorts;" and in the discussion which followed the reading of that report nothing was said calling that assertion in question.

I trust that the interest which has already been shown in this movement may increase, and that ere long the boon of Sunday's rest may be enjoyed by all our stokers.

Nine Elms, S.W., Oct. 4, 1871. ROBERT MORTON.

THE PATENT GAS COMPANY.

SIR,—In the "Circular to Gas Companies" contained in your JOURNAL of the 26th ult., you were good enough to draw attention to the fact that the Corporation of the City had requested a committee of their body to visit Dr. Eveleigh's gas-works at Peckham, and report on the value of his patented process for producing gas.

Your remarks on that process were based upon the specification of Dr. Eveleigh's *first* patent; but, as the recent patent extends so much further than the first, your conclusions, that the process partook more of the character of carburation than anything else, would be modified by a perusal of the complete specification and plans which were filed on the 21st of August last, and are now published.

I do not desire to occupy your valuable space by entering into the question of the inventor's explanation of the changes which take place in the "redistillation retorts," or, indeed, into the merits of the invention at all, or its analogy with the process patented by Mr Basford, but simply to state that the company which has undertaken to work out Dr. Eveleigh's patents has made arrangements with the directors of a gas-work in the neighbourhood of London, whereby the merits of the invention will be put to the test of practical use under the ordinary circumstances and contingencies attending the supply of gas to the public.

The chief features of these arrangements are, that the Patent Gas Company shall make and supply—

1. Gas of 20 candles illuminating power.
2. Gas to be absolutely freed from ammonia.
3. The sulphur in the gas, in any form, not to exceed 6 grains per 100 cubic feet.

The experiments at Peckham, which have been conducted for a considerable time on a fairly large scale, have clearly demonstrated that the above three conditions can be attained from ordinary gas coal without the aid of cannel, whilst the cost of the gas at the station-meter will be quite as little (*and we maintain even less*) than by the processes now in use.

The necessary alterations in the works for carrying out the arrangement, which provides for 100,000 cubic feet per day, are now being made, and I hope they will be completed and in full operation by the middle of December next, when the merits of the invention will be more clearly and effectually demonstrated than in any other way.

As soon as the works are ready, it is the intention of the directors of the company to invite every one connected with gas manufacture to visit them, and judge for themselves.

I may here mention that the testing of the gas made under the arrangement referred to is to be effected by the chief gas examiner of the metropolis; thus affording a guarantee to the public that the conditions are fully complied with.

W. H. BECK, *Secretary.*

Office of the Patent Gas Company, Limited,
20, Budge Row, Cannon Street, London, Oct. 6, 1871.

Legal Intelligence.

ERDINGTON PETTY SESSIONS.—WEDNESDAY, SEPT. 27, 1871.
(*Before Col.* RATCLIFF, *Mr.* T. RYLAND, *and Mr.* J. LEDSOME.)

VAUGHAN *v.* THE BIRMINGHAM AND STAFFORDSHIRE GAS COMPANY.

In this case the company were summoned under the Nuisances Removal Act, for having, on the 23rd of August and the 6th of September last, allowed a chimney on their works at Duddeston Mill Road, Saltley, in the parish of Ashton, to send forth black smoke in such a quantity as to be a nuisance.

Mr. PAGE appeared for the complainant, and Mr. EVANS for the company.

Mr. PAGE, in stating the case, quoted the sections of the Act under which the complaint was made. He thought that, as the local authorities had refused to take any steps in the matter, he was empowered, under the 23rd and 24th Vic., c. 77, sec. 13, to proceed upon the information of his client. The clause is as follows:—"Upon complaint before a justice of the peace by any inhabitant of any parish or place of the existence of any nuisance on any private premises in the same parish or place, such justice shall issue a summons requiring the person by whose act, default, permission, or sufferance the nuisance arises, or if such person cannot be found or ascertained, the owner or occupier of the premises on which the nuisance arises, to appear before two justices in petty sessions assembled, at the usual place of meeting, who shall proceed to inquire into the said complaint, and act in relation thereto as in cases where complaint is made by a local authority, under section 12 of the said Nuisances Removal Act, and as if the person making the complaint were such local authority."

Mr. *Digby Jenkins,* examined by Mr. PAGE, said, on the 23rd of August, he was at Saltley, and watched the defendants chimneys, from which black smoke issued for four hours. On the 6th inst. he watched the chimneys from half-past nine till half-past twelve, and during the whole of that period one or both of the chimneys emitted black smoke.

Cross-examined by Mr. EVANS: He lived at Aston, a mile and a half from the works. He could not say which chimney smoked most, but both were smoking nearly all the time he was there.

Mr. *John Vaughan,* examined by Mr. PAGE, said he lived at Saltley, and was the complainant in this case. On the 6th of September he saw both chimneys at the gas-works sending out very dense volumes of black smoke from nine till half-past twelve in the morning, when he went away. Always on Sundays and week days, by night and by day, the chimneys were discharging thick black smoke, and were a great nuisance.

Cross-examined by Mr. PAGE: He had proceeded against the company at Warwick, but failed. He had not applied to the local authorities. He did not know what local authority to apply to.

Mr. *Edward Jones,* of Saltley, examined by Mr. PAGE, said he saw very dense masses of smoke proceeding from the company's chimneys from eight to half-past nine on the 23rd of August. The nuisance had not been so bad during the last few days.

Mr. *Bailey,* nurseryman, Saltley, deposed that he lived about 500 yards from the works. The smoke arising from the chimneys was a great nuisance, and injured his plants which were in the garden.

For the defence, Mr. EVANS contended that the complainant had not made out any case against his clients. Under the Acts mentioned in the summons, no person could take proceedings for a nuisance without giving notice to the local authorities, and they were satisfied that proceedings ought to be taken. He considered that his clients had been dealt with most unjustly, as they had received no notice under which Act of Parliament the proceedings would be taken. The company had paid a large sum of money to Mr. Adderley for the land on which their works were erected, and he could prove, and would prove, by the ablest engineer of the day, that his clients works were the best managed and constructed in England. If it was a continuous emission of smoke then he could understand complainant applying to the magistrates; but it was not a continuous emission, as one of complainant's witnesses admitted that there had not been any smoke for the last five or six days. He would prove that there were other works surrounding the company's works which were sending up smoke in greater volumes than his clients did, so that it was not the smoke from defendants chimney that killed Mr. Bailey's shrubs. It was not a private matter the magistrates had to deal with; it was with a public nuisance. The Act of Parliament left it to the public authorities whether the Act should be proceeded with.

Colonel RATCLIFF said the magistrates would adjourn the case for a month, to enable them to make an inspection of the premises.

Miscellaneous News.

PHŒNIX GASLIGHT AND COKE COMPANY.

The adjourned Half-Yearly General Meeting of Proprietors of this Company was held at the Bridge House Hotel, Southwark, on Wednesday, Oct. 4—Edward Horner, Esq., in the chair.

The Secretary (Mr. I. A. Crookenden) read the notice convening the meeting, and the minutes of the last meeting, which were confirmed.

The following report and statements of account were presented:—

The directors submit the trade account and balance-sheet to the 30th of June last.

Notwithstanding the reductions in the price of gas, the rental is in excess of that for the corresponding period of last year.

It is recommended that the call, announced at the last meeting as necessary to meet the cost of extensions of mains and other works, be now made at the rate then mentioned—viz., 5 per cent., payable on the 1st of November ensuing.

The parliamentary notices, to which your attention was called at the last meeting, were not (it is believed from press of business) proceeded with, and it is hoped will not again appear, so far as the south side of London is concerned; for the directors, taking into consideration the great desire on the part of the Board of Trade that the companies on the south side of the Thames should amalgamate in order that expense may be saved by a more concentrated management, have entered into negotiations with the South Metropolitan Company and the Surrey Consumers Company for the purpose of amalgamating, and have agreed upon a basis with them for such purpose, subject to the approbation of their several proprietors.

As soon as the scheme for amalgamation has been matured, the directors will call a meeting of the proprietors to obtain their sanction and authority to apply for a bill for carrying out the same in the ensuing session of Parliament.

The net amount of profit upon the half year's trading is £44,476 17s. 3d., which, added to the undivided balance of £30,460 5s. 10d. (after paying dividends in March last), makes a total of £74,937 3s. 1d. to the credit of profit and loss, as per that account, out of which your directors recommend that dividends be declared as follow, viz.:—

On the £20 divided shares	10	per cent. per annum.
„ New stock	7½	„ „
„ Capitalized stock	5	„ „

less income-tax, leaving an undivided balance of £38,937 3s. 1d.

Dr. — *Abstract of the Trade Account, Half Year to June 30, 1871.* — *Cr.*

Coals used	£42,566	12 5	By Rental	£103,432	0 5
Materials supplied	9,802	9 11	Coke	19,494	16 4
Meters—repairs and renewals	1,853	19 11	Breeze	101	3 7
Rates	2,896	10 11	Tar	3,383	6 7
Directors, £1000; auditors, £50	1,050	0 0	Ammonia	1,517	15 9
Salaries	6,080	4 7	Rents	1,557	11 4
Wages	16,408	4 4	Miscellaneous receipts	303	12 6
Bad debts and allowances	797	0 4	Interest	24	6 0
Interest on bonds	2,882	8 0			
Leasehold-fund	430	0 0			
Rents	431	8 0			
Interest	138	16 10			
Net profit	44,476	17 3			
	£129,814	12 6		£129,814	12 6

Profit and Loss.

March, 1871.—To dividend for half year ended Dec. 31, 1870	£36,000	0 0	Jan., 1871.—By balance brought forward	£66,460	5 10
June 30, 1871.—To balance carried forward	74,937	3 1	June 30, 1871.—By half year's profit	44,476	17 3
	£110,937	3 1		£110,937	3 1
			July 1, 1871.—Balance brought down	£74,937	3 1

Dr. — *Abstract of the Balance-Sheet, June 30, 1871.* — *Cr.*

To Capital of 27,000 £20 shares, paid in full (maximum dividend 10 per cent.)	£540,000	0 0	By Amount of plant on Dec. 31 last	£890,031	15 7
Capitalized stock, paid in full (maximum dividend 5 per cent.)	144,000	0 0	Expended this half year for extension of works	3,749	15 11
New stock, £360,000, £40 per cent. paid up (maximum dividend 7½ per cent.)	144,000	0 0		£893,781	11 6
Bonds, at 5 per cent.	115,296	0 0	Investment of leasehold-fund	15,543	11 11
Unpaid dividends	119	4 3	Amount due for rental—		
Ditto tradesmen's bills, &c.	14,578	19 8	Midsummer quarter £37,452 6 10		
Leasehold-fund	15,543	11 11	Arrears 2,129 3 3	39,581	10 1
Balance of profit and loss—			Amount due for coke £5,433 18 4		
Undivided balance £30,460 5 10			Ditto breeze 27 9 0		
Half year's profit 44,476 17 3			Ditto tar 2,363 16 0		
	74,937	3 1	Ditto ammonia 675 4 0		
			Ditto sundries 2,499 19 3	11,000	6 7
			Stock of coals £5,935 15 6		
			Ditto coke 571 17 6		
			Ditto breeze 10 5 0		
			Ditto tar 252 18 6		
			Ditto ammonia 91 6 6		
			Ditto retorts 1,296 6 0		
			Ditto pipes 3,152 5 9	11,310	14 9
			Meters	40,395	1 11
			Balance at treasurer's	6,862	2 2
			Ditto on deposit at interest	30,000	0 0
	£1,048,474	18 11		£1,048,474	18 11

The Chairman: Gentlemen, in moving the adoption of the report, I may truly say that our accounts are more eminently satisfactory on this than they have ever been on any previous occasion. We have, fortunately, during the past half year, been in that position that we have not been called upon to make any great expenditure to enable us to carry on our operations. We have made the utmost use of the plant we already possessed, and the result has been that during the half year our rental was actually £6000 better than for the corresponding period of last year, and £2000 better than for the half year ending at Christmas last. You will recollect that on the last occasion I told you the rental was made rather larger than it should be at Christmas in consequence of the state of the consumers meters being taken in one district somewhat later. It made a difference in the rental of £1400 or so, which would otherwise have come into this half year's account. Taking that into consideration, it will be found, as I said before, that our rental this half year is £2000 more than it was for the previous six months. The sales of residual products have been exceedingly favourable. Ammonia has realized a price never known at any former period. We have also been fortunate in disposing of our coke at good prices. We must not, however, flatter ourselves that such excellent results can always be obtained; indeed, it is scarcely possible that our residual products should continue to yield the same results. On the other hand, coal has been exceedingly cheap, and it is probable that, with the strikes in the north, a rise in price may eventually take place. We therefore cannot regard our accounts to-day as exhibiting a state of things which will exist permanently. And herein, I think, is the great mistake which the Legislature has made in fixing a hard and fast line with regard to the price at which gas should be sold, because the article from which gas is made, as well as the residual products of the manufacture, are liable to constant fluctuations in value, which fluctuations are entirely beyond the control of the companies. Fortunately, we have a contract, which has a considerable time to run, for our coals, and therefore, for the next 12 or 18 months, we may calculate upon the existing state of things. What may afterwards take place we cannot possibly foretell. The result of our operations during the past six months is that our profits are £2342 more than they were for the corresponding period of last year, and this will enable us to make a very considerable addition to our reserve. In fact, we are now in such a position as we never were in before since I became a director of the company, for, after paying you your dividend for the past half year, we shall have a sufficient sum in hand to pay another dividend, even if we earned nothing in the current half year. I think this fact cannot but be looked upon as a favourable guarantee for the continuance of dividends for some time to come, even if it should be our misfortune to meet with reverses. You will agree with me, therefore, that this is a very satisfactory state of things. In our report, we also inform you that we have agreed upon the basis of a scheme for the amalgamation of the companies in this district. Of course every one present is aware that there has been considerable agitation upon the subject of the amalgamation of the gas companies in the metropolis. The Board of Trade are most anxious that in the different districts north and south of the Thames the management of the several companies should be concentrated in such a manner as to conduce to economy of administration, with a view to the supply of gas at the lowest possible price to the public. We have ourselves really no desire to do anything of the kind, because we are in a position to pay our proprietors their full dividend; but the Board of Trade have put such a pressure upon the companies that we have endeavoured to a great extent to carry out their views, which I think can be done without injury, and probably with advantage to your interests. We have great encouragement to take the step, inasmuch as we find that the companies on the other side of the river, which have amalgamated, seem to have realized the greatest advantage from the arrangement. I believe their accounts show that concentrated management has resulted in an increase of profits, which has even surprised themselves. When the proper time comes, and the scheme for an amalgamation of this company with the other two companies on the south side of the Thames is matured, we shall call you together to consider the subject. We shall not think of taking any step towards that object without the approval of the proprietors, because we have nothing but their interests at heart, and having a large stake in the concern ourselves, you may be assured we shall not assent to any arrangement that will damage our property. With reference to the accounts, I think they speak so well for themselves that I need not detain you with any comment upon them. I therefore content myself by moving—"That the report and accounts be received and entered on the minutes."

Mr. Cooper: I second the motion, and only wish to make one remark with regard to the proposed amalgamation. I do trust that the greatest caution will be taken by the directors, so that the other companies who will be uniting with us may not be put in a better position than ourselves. In the case of the amalgamations on the other side of the river, I know that the Chartered Company have given a 10 per cent. preference to two of the companies which have joined them, the effect of which has been to raise the value of their shares from £85 to £100, while the Chartered shares are £25 less. Now it might so happen in the future that, owing to events we cannot foresee, the Chartered Company's shareholders might only be getting 5 per cent, while the companies which joined them have a guaranteed 10 per cent. I do not see why the companies coming into an amalgamation should not all be placed on the same footing, because, what is good for one is good for another. We are ourselves in a good position, and, therefore, I hope that if an amalgamation is to take place, the whole question will be brought before the shareholders, that we may have the opportunity of speaking upon it.

A Shareholder: I notice on one side of the accounts that a very large sum—£890,000—appears as expended upon plant, but on the other side I do not find any item of depreciation of plant. Moreover, I see that some additions have been made to the plant during the half year, which are taken at their full actual cost, and there is no statement of depreciation on the debtor side of the account.

The Chairman: With regard to the question of my friend opposite (Mr. Cooper), I can assure him and the proprietors generally that nothing will be done with regard to the amalgamation without giving you all the fullest opportunity to discuss the matter. We have not the slightest idea of doing anything without your sanction and approval, and we shall take care that you have all the necessary information before you upon which to form a judgment. With regard to the question as to the plant of the company, I may remark that, according to the present Act of Parliament, we are not allowed to put anything aside for depreciation. The depreciation of plant became, at last, nothing more than this—we kept the works in perfect repair, and wrote off so much from time to time out of our dividends as depreciation, which amount was again laid out upon capital. In this way you will remember we had £144,000 of capitalized stock, which consists of depreciation written off half year by half year, and laid out as capital for extension of works. When we applied for our last Act of Parliament, the committee to whom our bill was referred

saw that the amount had actually been paid out of profits applicable to dividend, and they gave us the benefit of it. No expense is spared by us in keeping our works in the most efficient state, and this we do without writing off anything for depreciation as we used to do. A visit to the works will convince you that they are all in the most complete condition it is possible for them to be.

A SHAREHOLDER: I see that after paying the dividends to-day you will have a very large balance in hand. I want to know whether, as that is the case, we could not receive our dividends without deducting income-tax.

The CHAIRMAN: The answer to that is that we are not allowed to do so. If we paid the income-tax in addition to the 10 per cent., it would, in reality, be paying more than our maximum dividend.

A SHAREHOLDER: I think it would be very convenient, if it could be so arranged, to hold our meetings in the City instead of on this side of the bridge.

The CHAIRMAN: The answer to that is that our Act of Parliament requires us to hold our meeting in the district which we supply in Surrey.

The motion for the adoption of the report was put, and carried unanimously.

The DEPUTY-CHAIRMAN (Mr. Shand): The amount of the profits being declared, it remains for me to propose that the same be made available. I therefore beg to move—"That dividends for the half year ending the 30th of June last be and the same are hereby declared and made payable out of the profits of the undertaking, at the following rates—viz., at and after the rate of 10 per cent. per annum on the original shares of the company; at and after the rate of 5 per cent. on the capitalized stock; and at and after the rate of £7 10s. per cent. upon the amount paid up on the new stock of the company; deducting income-tax on each of the above. That such dividends be payable to the bankers of the proprietors so ordering it, and that the remaining dividends be forwarded by post."

The motion was seconded, and carried unanimously.

The CHAIRMAN: Gentlemen, the next business is to propose to you a call of 5 per cent,, which I do not suppose, under existing circumstances, will be regarded as very objectionable. At the same time, you are entitled to know why we make a call, and what we have done with the last money we received from you. The last call amounted to £18,000, and I shall be able to show you that we have spent £9000 more than that sum. We have laid mains to the amount of £10,452; we have extended our purifiers to the amount of £676; upon gasholders we have laid out £6537; we have increased our retorts to the amount of £1410, and our meters to the amount of £4739. We have also mains in stock of the value of £3152, making a total expenditure of £26,966. As we are still increasing the size of our mains very considerably, we now ask you to sanction a call of 5 per cent. to pay for these extensions. We have, in fact, laid out already nearly £9000 more than the last call, therefore we do not consider we are making the present call too soon. At the same time I may state, in order to show how very closely the business of this concern is conducted, that the floating capital amounts to only £9809 in addition to the balance over and above your dividends. You see, therefore, that we do not ask you for money until we really are in such a position that we actually carry on your affairs almost without any working capital at all—a fact which has tended to the increase of the dividends, there being so much less to pay upon. I now move—"That a call of 5 per cent. upon the new stock be and the same is now made on the several proprietors in this undertaking, according to their registered amount of such stock, and that such call be paid into the hands of R. C. L. Bevan, Esq., 54, Lombard Street, the company's banker, on or before the 1st of November next."

The motion having been seconded, was put, and carried unanimously.

Mr. COOPER: The business of the meeting being now at an end, I hope we shall not separate without expressing our confidence in the directors for their very able management of the affairs of the company. I move a vote of thanks to them.

Mr. STEWART seconded the motion, which was cordially adopted.

The CHAIRMAN: Gentlemen, on the part of my brother directors and myself, I beg to thank you for the very handsome manner in which you have acknowledged our services. I hope we shall continue to be as prosperous as we have been in the past, and that when we meet you again we shall be able to lay before you as satisfactory a statement of affairs as we have done on the present occasion.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Ordinary Half-Yearly General Meeting of the Shareholders of this Company was held at the London Tavern, on Thursday, Sept. 28—ERASMUS WILSON, Esq., F.R.S., in the chair.

The SECRETARY (Mr. Magnus Ohren) having read the advertisement convening the meeting, the seal of the company was affixed to the register of shareholders.

The following report and statement of accounts were laid before the meeting:—

The directors have to report that the business and progress of the company have been satisfactory during the half year.

Notwithstanding the reduction which has already been made in the price of the gas, the rental has steadily increased, and the directors have declared a further diminution of price, to take place from and after the next Christmas quarter.

The reports of the chemical adviser of the company and of the medical officers of the parishes supplied by the company, on the purity and illuminating power of the gas, continue to be satisfactory. During the half year, twenty-three visits have been made to the works (without notice) by Dr. Letheby on the part of the company, and Dr. Puckle and Dr. Bernays on behalf of the parishes of Lambeth and Croydon respectively; and the average result of these examinations has given an illuminating power of 15·38 standard sperm candles.

A vacancy has occurred in the the office of auditor, in consequence of the resignation of Mr. William Purvis from ill health, and the shareholders will be called upon to elect an auditor to fill the vacancy.

At the request of the directors, the accounts for the past half year have been audited by Mr. James Glaisher in conjunction with the auditor, Mr. John Gray; and Mr. Glaisher offers himself to the shareholders as a candidate for the vacant office of auditor.

The balance-sheet for the half year to the 30th of June last, appended to this report, shows the financial position of the company. The profit for the half year is £6930 6s. 0d., which, together with £42 13s. 11d., the unappropriated profit of the preceding half year, makes the available balance £6972 19s. 11d. Out of this sum the directors recommend the declaration of a dividend at the rate of 6 per cent. per annum on the preference capital; a dividend at the rate of 7 per cent. per annum on the ordinary 7 per cent. capital; and a dividend at the rate of 10 per cent. per annum on the original capital; all free of income-tax. They also recommend that the sum of £500 be written off preliminary expenses; and that the balance of £39 11s. 8d. be carried forward to the profit of the succeeding half year.

Dr. *Profit and Loss, Half Year ending June 30, 1871.* *Cr.*

To Amount of coals carbonized		£9,891	5 4	By Private rental, Lady-day quarter	£13,209 2 7	
Lime, oxide, and labour		183	2 11	Public ditto, ditto	1,335 1 8	
Trade charges		1,000	6 0	Private rental, Midsummer quarter	7,145 13 5	
Mains renewal account		230	2 7	Public ditto, ditto	1,251 16 9	
Works renewal ditto		1,928	3 2			£32,941 14 5
Meters renewal and repairs account		513	8 9	Meter-rental		397 3 7
Rent, rates, and taxes		1,032	7 6	Coke made for sale	£4,610 1 3	
Directors and auditors fees		530	0 0	Breeze ditto	102 16 6	
Salaries and collectors commission		1,544	0 2	Tar ditto	533 2 1	
Wages		2,924	18 11	Sundries	210 10 2	
Interest on loans		334	12 1			5,456 10 0
Bad debts and allowances on collection		181	16 2	Ammoniacal liquor and sulphate of ammonia		929 1 7
Retort account		500	0 0			
Contingent-fund		2,000	0 0			
Profit		6,930	6 0			
		£29,724	9 7			£29,724 9 7

Dr. *Balance-Sheet, June 30, 1871.* *Cr.*

To Proprietors for paid-up capital—				By Amount for plant, &c.	£166,935 0 3
5000 preference shares, at £10 per share		£50,000	0 0	Freehold land	8,886 17 8
5000 original shares, at £10 per share		50,000	0 0	Preliminary expenses	2,500 0 0
10,000 ordinary 7 per cent. shares, at £10 per share	£100,000 0 0			Retort account	384 17 1
Less amount uncalled	30,384 0 0			Stock on hand	9,666 12 9
		69,616	0 0	Amount due from sundry persons	723 19 11
Loans on debenture		9,555	0 0	Invested in Consols from contingent-fund	134 14 0
Amount due to sundry persons		10,393	15 1	Private gas and meter rental, Midsummer quarter	7,116 0 8
Contingent-fund—				Arrears	344 15 8
Uninvested	£6,371 18 7			Public rental, Midsummer quarter	1,251 16 9
Invested	134 14 0			Fittings	38 7 2
Appropriated from profit and loss for contingent-fund	2,000 0 0			Balance at bankers	7,061 5 8
		8,506	12 7		
Profit unappropriated		42	13 11		
Profit and loss		6,930	6 0		
		£205,044	7 7		£205,044 7 7

Appropriation of Balance.

Balance brought forward from last account		£42	13 11	Dividend on preference share capital, at 6 per cent.	£1,500 0 0
Ditto of profit and loss		6,930	6 0	Ditto on ordinary 7 per cent. capital, at 7 per cent.	2,433 8 3
				Ditto on original share capital, at 10 per cent.	2,500 0 0
					£6,433 8 3
				Preliminary expenses, to be written off	500 0 8
				Balance to be carried to next account	39 11 0
		£6,972	19 11		£6,972 19 11

The CHAIRMAN, in moving the adoption of the report and accounts, said the duty which devolved on him upon this occasion was of a very pleasing nature, because at this, as at many previous meetings, the directors had to report the continued prosperity of the company's business, the satisfactory state of the works and mains, and the possession of a body of zealous and efficient officers, who were able and prepared to maintain the success of the undertaking. The shareholders would be gratified that the reference to the purity and illuminating power of the company's gas occupied a prominent place in the report. This was a matter of constant care on the part of the directors, who were desirous to supply as perfect an article of consumption as it was possible for science and chemistry to produce. The second paragraph in the report was, perhaps, the most interesting and important of the whole—though not the longest—as it served to confirm the sentiments which the shareholders had been in the habit of hearing from the directors, and which had been so liberally responded to by them whenever the subject had been brought forward. In that paragraph they were informed that, owing to the steady progress of the company's business, the directors were in a position to announce a further reduction in the price of gas to the public, so that from and after Christmas next the consumers within the district of the Crystal Palace Company would be provided with gas of a quality—to use a newspaper expression—which "defied competition," at the exceedingly moderate rate of 4s. 2d. per 1000 cubic feet. Previous reductions in the price of gas had not resulted in any diminution of the profits of the company. In fact, so far from that, the effect had been to stimulate an increase in the consumption, so that the interests of the shareholders had not been damaged in the slightest degree. There was one other observation he might make in connexion with the progress of the company, which had not a physical, but a moral aspect. The directors had thought it desirable to endeavour to relieve the operatives employed by them from the necessity for labour during Sunday. At the present time, and for some weeks past, no gas had been made at the company's works on Sunday. Arrangements had been made so as to leave that day free to the workmen to devote to religious duties, thus taking from the business of gas manufacture one of the objections hitherto urged against it—that it involved labour not only every other day in the week, but even on that day which, in this country at least, was regarded as one of sanctity and repose. With these remarks, he moved—"That the report of the directors, with the balance-sheet confirmed by the auditor, assisted by Mr. James Glaisher, be received, adopted, and entered upon the minutes."

The DEPUTY-CHAIRMAN (Mr. H. P. Stephenson) seconded the resolution.

The motion was put, and carried unanimously.

Mr. STEPHENSON then moved—"That a dividend at the rate of 6 per cent. per annum on the preference capital, a dividend at the rate of 7 per cent. per annum

on the ordinary 7 per cent. capital, and a dividend at the rate of 10 per cent. per annum on the original capital, all free of income-tax, be now declared and made payable forthwith, and that £500 be written off preliminary expenses." He was sure that this was a resolution the meeting would very willingly agree to, and therefore it was not necessary to urge anything in its support; but there was one point in connexion with the accounts to which he wished to draw attention, because in these days so much was heard of defaulting secretaries and collectors. No doubt the shareholders were aware that in one of the large provincial companies a similar misfortune to that which befell the Great Central Company a year or two ago had just been made public. In both these cases the frauds arose from the very large amount of gas-rental in arrear, to which the attention of the directors was not properly directed. Some of the shareholders might imagine that in this company it was possible for such a catastrophe to occur, and therefore to relieve their minds he would call their attention to the accounts now before the meeting, from which it would be seen that the arrears of gas-rental up to the 30th of June last only amounted to the sum of £344. He believed that if gas companies generally adopted the system enforced by the directors of this company—viz., that of taking the whole of the collectors charges out of their hands at the close of each quarter, and placing them in the hands of an officer specially appointed to recover them—it would go far to stop the possibility of a fraud to any extent occurring.

Mr. LINGING (a director) seconded the motion, which was put, and carried unanimously.

Mr. HENRY COXWELL moved—"That Mr. James Glaisher be elected an auditor of the company, in lieu of Mr. William Purvis, resigned." In making such a proposition, it was not necessary to say anything, because Mr. Glaisher's pre-eminent capacity in all matters of statistics was itself a sufficient recommendation of that gentleman for the office.

Mr JOHN GRAY seconded the motion, and in doing so expressed the regret he shared with the general body of shareholders that ill health had necessitated the resignation of Mr. Purvis.

The motion was carried unanimously.

Mr. GLAISHER briefly acknowledged his sense of the confidence reposed in him by the shareholders, and assured them of his best and most careful attention to their interests.

Mr. GEORGE HYDE moved—"That the thanks of the meeting be given to the directors for their able management of the affairs of the company for the past half year."

Mr. MORRISON seconded the motion, and suggested that, in the present prosperous condition of the company's business, an addition should be made to the remuneration of the directors.

The CHAIRMAN, while expressing his obligations for the consideration shown by the honourable proprietor, reminded him that any proposal of the nature indicated by him would be wholly irregular, and could not be entertained.

The vote of thanks to the board was very cordially adopted.

The CHAIRMAN acknowledged the same, and took the opportunity thus afforded him to move—"That the thanks of the meeting be given to the auditors and officers of the company for the efficient discharge of their duties." The value of the services rendered to the company by these gentlemen was fully known to and appreciated by the shareholders. He believed that, from the highest to the lowest of their officers, the company had the best and most zealous that could be obtained, and therefore he had much gratification in asking the meeting to give expression to their satisfaction as to the way in which they had discharged their respective duties.

Mr. HENRY REID seconded the motion, which was put, and carried unanimously.

Mr. JOHN GRAY, on behalf of the auditors and officers, appropriately acknowledged the vote, and the proceedings then terminated.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of the Proprietors of this Company was held at the London Tavern, on Monday, October 2—THOMAS BRIDGE SIMPSON, Esq., in the chair.

The notice convening the meeting and the minutes of the last meeting were read and approved. The following report was then presented:—

At the last half-yearly meeting, the directors reported that the works of the company would require some considerable additions to meet the constantly increasing demands for gas, and for which it would be necessary to make another call on the new capital in the course of next year. Since then a proposal for the amalgamation of the three South London companies has been made by the Phœnix and Surrey Consumers Companies.

The question of amalgamating the three companies has been several times under the consideration of the directors, but the terms hitherto proposed have invariably been such as could not be entertained, considering the prosperous condition of this company. The offer now made, being of a more favourable character, has induced the directors to give the question that further consideration which the nature of such an important subject demands, and when the scheme is sufficiently matured it will be submitted to the proprietors for their sanction and approval.

The business of the company continues to be carried on satisfactorily, and the demand for gas is steadily increasing, the result for the half year being in excess of the corresponding period of 1870 by upwards of £4000.

The working apparatus is all in good order, and as the whole of it will be required for the coming winter, it may be necessary to make some temporary additions thereto. The directors do not, however, anticipate there will be any difficulty in meeting any such emergency, the resources of the company and the ability of the engineer being equal for any demand which may be made upon them.

The rental for gas and the receipts for products for the half year to June 30, 1871, amount to £63,336 3s. 10d., and the expenditure for the same period to £42,383 5s. 11d., leaving a balance of £20,952 17s. 11d. for the payment of the usual dividend.

The CHAIRMAN: Gentlemen, I beg now to move—"That the report be received and entered on the minutes, and, in doing so, I have but very few remarks to offer. I am happy to be able to assure you, as I have done for many years past on such occasions as the present, that the business of the company is progressing most satisfactorily, and that the plant is in a most excellent condition. In fact, I may truly say that we have nothing at all to complain of. With regard to the question of amalgamation, the report informs you that an offer has been made to us to unite with the Phœnix and Surrey Consumers Companies; but, owing to the indisposition of our secretary, a little delay has taken place in the negotiations, so that we are not able to place the subject before you at this meeting in a form in which it can well be discussed. We shall shortly have an interview with the directors of the other companies, and when the plan is matured we shall call you together again and lay it before you. We believe that, upon the whole, the proposal is one which may be adopted with advantage, and that, when it is submitted for your consideration, it will meet with your approval. I need, hardly, however, say that we do not entertain it because it is a necessity for the company to do so. We are in a most prosperous condition, but in the present unsettled state of the gas question, and with the differences in the price of gas charged by the companies on the south side of the Thames, it does seem advisable that some arrangement of the kind should be come to. I think that if the amalgamation does take place we shall carry with us so good a concern that the united companies will be able to lower the price, so that the public as well as the shareholders will derive the benefit. Looking at the whole question, and seeing that in the opinion of the Government the amalgamation of the companies is desirable so as to economize working expenses, we think it right to carefully consider whether it can be effected with a due regard to the interests of those whose capital is embarked in these undertakings. Probably, too, such an amalgamation may be effected at the present time with more advantage than it could be done hereafter; but, as I said before, we are not at the moment prepared to lay the plan before you in a way that would enable you properly to discuss it. With these few remarks, I move the adoption of the report.

Mr. GRAY: Suppose no amalgamation takes place, I presume the call will be made to meet the expense of the enlargement of works referred to in the report.

The CHAIRMAN: At the present time I am not in a position to reply to the question.

A PROPRIETOR: If the amalgamation does take place, I understand the call will not be required.

The CHAIRMAN: Not so soon. If it does not take place the call would probably be made in the course of next year.

Mr. BLACK: I need not take up the time of the meeting by offering any remarks respecting the valuable services rendered to the company by our excellent secretary, Mr. Livesey; but I think now is the time to propose an addition to his salary. I shall move, therefore, that it be increased to £1600 a year, so that in the event of the amalgamation taking place, he will receive a retiring allowance equal to his present income. It is only an act of justice to Mr. Livesey that this should be done, and if we do not adopt such a proposition as I have made, we shall hereafter not be in a position to do it.

Mr. GRAY: I take very much the same view as that entertained by the honourable proprietor. I think the successful management of this company—far surpassing that of any other company in the metropolis—is fairly attributable to the ability and energy of our worthy secretary, aided, no doubt, by the zealous co-operation of the directors. I am sorry to see that Mr. Livesey is suffering from indisposition, and trust that he will soon be restored to health and strength. When, however, the amalgamation takes place, should he find himself unequal to the discharge of his important duties, it would be quite right and just, after so many years service, that he should retire upon his present income. With reference to the report of the directors, it is in every respect satisfactory. We are reaping the fruits of the successful management of our affairs; at the same time I quite concur with the directors that the time has arrived when we may seek for an amalgamation with the other two companies, so that it can be done on terms which will be satisfactory to the proprietors. The directors have exercised a proper reserve in not entering upon a discussion of the question to-day, as the arrangements are not sufficiently forward, and we have their assurance that in due time they will seek the concurrence of the proprietors before concluding any agreement for an amalgamation. I congratulate myself and my friends around me upon the state of things laid before us to-day, and I sincerely trust that if an amalgamation with the other companies takes place we shall continue to enjoy the same state of prosperity.

The CHAIRMAN: The question before the meeting is the adoption of the report, and when that is settled we shall be happy to hear the worthy proprietor who has spoken with reference to the remuneration of the secretary.

The motion was put, and carried unanimously.

The following statements of account were then presented:—

Dr. *Balance-Sheet, June 30, 1871.* *Cr.*

To Balance of capital	£34,299	8	9	By Consols, reserve-fund	£20,000	0	0
Reserve-fund	20,000	0	0	Do., renewal-fund	8,336	11	3
Renewal-fund	8,336	11	3	New Three per Cents.	13,781	5	0
Profit and loss account	32,486	3	11	Cash at bankers	28,979	6	1
Sundry creditors	1,819	3	1	Do. in hand, for freight accounts, &c.	600	0	0
Deposits	1,670	15	7	Stocks—			
Property-tax account	50	19	0	Coals	3,147	18	0
Dividend account	4	18	4	Coke and breeze	85	15	0
				Tar and liquor	155	0	0
				Mains and meters	2,405	12	2
				Amount due for—			
				Gas	20,013	4	5
				Products	703	7	2
				Sundries	145	19	0
				Interest	314	1	10
	£98,667	19	11		£98,667	19	11

Dr. *Revenue Account, June 30, 1871.* *Cr.*

To Coals	£22,351	2	5	By Gas at 3s. 2d. per 1000 feet	£42,762	13	5
Purifying material, &c.	433	5	4	Do. at 3s. per 1000 feet	612	11	7
Salaries, engineer, &c.	1,343	18	8	Public lighting	6,561	14	6
Wages	6,136	0	4	Coke, less labour loading	9,112	1	8
Repairs and maintenance less old material sold	1,888	18	2	Breeze	204	18	6
Repair and renewal of mains, &c.	1,933	12	10	Tar	1,310	13	10
Salary of clerks and inspectors	1,107	12	0	Liquor	2,011	12	7
Repairing and renewing meters	743	5	8	Rents	245	12	1
Lighting and repairing lamps	1,398	0	7	Transfer fees	3	10	0
Rent	246	12	9	Other items	570	15	9
Rates and taxes	1,464	13	9				
Directors	600	0	0				
Auditors	50	0	0				
Salary, secretary, &c.	612	15	0				
Collectors commission	905	16	0				
Stationery and printing	134	18	7				
General charges	469	15	10				
Superannuation-fund	54	12	0				
Gas referees, and auditors, &c.	110	7	0				
Bad debts and allowance	397	19	0				
Balance	20,952	17	11				
	£63,336	3	10		£63,336	3	10

On the motion of the CHAIRMAN, the accounts were received.

Mr. PRIDDEN: On the question of our balance-sheet, I would just make one remark. We have hitherto had a general statement of assets and liabilities, but on the present occasion we have only the balance of unexpended capital given. There is no statement as to how our capital has been called up and how expended.

The CHAIRMAN: The accounts as now made out are in the form ordered by the official auditor.

The SECRETARY: These accounts are exactly the same as those heretofore presented, except as to the item of capital. Here you see only the balance. The capital is £300,000. There has been expended on works £230,196, on freehold £35,505, leaving a balance of £34,299. This account is made out in strict accordance with the directions of Mr. Parkes, and he will not allow them to be made out in any other.

Mr. BLACK then renewed his motion for increasing the remuneration of the secretary from the 30th of June last.

Mr. GRAY seconded the motion, which was put, and carried unanimously.

The SECRETARY: Mr. Chairman and gentlemen, this matter has taken me very much by surprise. I certainly never expected anything of the sort. I can only say that I am greatly obliged to Mr. Black for the very kind manner in which he introduced my name, and also to Mr. Gray for the way in which he seconded the handsome proposition in reference to my salary. I have now been with this company 32 years; I have been connected with gas-works for 50 years, and am almost worn out. Whether I shall live long to enjoy your kindness I know not. I can only assure you, however, as I have often done before, that while I have the ability and power my best services will be devoted to the interests of the company.

On the motion of Mr. GRAY, it was agreed that the remuneration to the directors be continued at the rate of £1200 per annum.

The CHAIRMAN moved—"That a dividend at the rate of 10 per cent. per annum be now declared, and made payable on the 5th inst."

The motion was carried unanimously.

On the motion of Mr. GRAY, a very cordial vote of thanks was given to the directors for their attention to the business of the company.

The CHAIRMAN, in acknowledging the vote, said—Gentlemen, it is truly gratifying to the members of the board to receive again the assurance of your satisfaction and confidence. After upwards of 30 years connexion with you to find that we still hold so high a place in your estimation, is, in itself, a great reward for the attention we devote to your affairs. It is with much pleasure we conduct your business, and witness its growing prosperity. Many of our old friends will remember it was not always that things looked so pleasant. We have lived in troublous times, but I am thankful those are past, and that everything in connexion with the company is now matter for congratulation by the proprietors.

ON THE QUALITY OF THE WATER SUPPLY OF SOME OF THE LARGE CITIES AND TOWNS OF ENGLAND AND SCOTLAND IN RELATION TO THEIR SANITARY CONDITION.

By H. LETHEBY, M.B., M.A., &c.

[Read before the Association of Medical Officers of Health, on Saturday, May 20.]

(*Concluded from page* 729)

"In the first group, with its largest masses of population, and its highest degrees of hardness of the waters, we elicit a yearly mean mortality of 21·9 per 1000 of the living. In the second group, in which Edinburgh and Leith take their place, in spite of what should have been the advantage of the smaller masses of the population, the diminished hardness of the waters connects itself with a mortality increased to 24·9 per 1000. Passing to the third group, in which Dundee and Paisley are situated, with what should have been the yet greater advantage of the masses of the population having undergone a further reduction, we find, with the still decreasing hardness, a still increasing mortality, the amount now rising to 26·3 per 1000. And in the fourth and last group, in which Glasgow, Greenock, Aberdeen, and Perth find their position, again the yet further diminished average of the masses of population foregoes its advantage, and the lowest proportion of hardness is marked by the highest proportion of mortality, which stands now at a yearly average of 28·5 per 1000 of the living. This result, by its near correspondence, confirms that arrived at by Dr. Letheby and his associates from their less ample details, which, with an average hardness of 14·9, gives a mortality of 22·2, and with a hardness averaging 4·9, a mortality of 26·1; the mean of the last three groups, as detailed above, being, when taken together, 4·2 of hardness, and 26·6 of mortality. If this so uniform descending in the hardness of the water, and climbing of the rate of mortality, could be viewed as but a coincidence, it carries with it, at least, a terrible consistency that may well arrest attention. But to regard it as a mere coincidence would be manifestly to reject unreasonably the best description of evidence which such a subject is capable of admitting. It is true that the condition of health of a community is contingent, not on any single natural influence, but on the mutual actions and reactions of a variety of agencies in relation to regimen, diet, atmosphere, &c., on the presence of which, in greater or less purity or cogency, the general issue depends. But it is the province of statistics, should the result, in any individual example, appear to be affected by the failure or predominance of any individual agency, to spread the inquiry over an enlarged field, so that the disturbing element in one direction becomes neutralized by the existence and adduction of a compensating element in another. And, above all, it is to be noted whether, however other elements may waver, there be one element that is uniformly present, and in a ratio that is ever capable of being nearly determined. Such an element, so capable of being known and measured, we have here, along with the water itself, in the varying quality of its hardness, as denoting the degree of its impregnation with carbonate of lime; beside which must be placed the other superior properties of a water with which that impregnation is customarily associated."

Summary Abstract of Tables.

Degree of Hardness.	Number of Towns.	Average Death-Rate per 1000 of Population.	Average Degree of Hardness.
Over 10	25	... 21·9	... 16·0
10 to 6	17	... 24·9	... 8·0
6 to 2	15	... 26·3	... 3·8
2 and under	8	... 28·5	... 1·3

And, lest the true meaning of these tables should be misapprehended, it is right to say that they do not in any sense imply that soft water is the immediate cause of the higher rates of mortality, but that hard water is, in some way, concerned with the preservation of the public health. The results, in fact, show that in a number of large towns with every variety of hygiene, as regards situation, whether it be inland or near the sea-shore, at high elevations or at low, with every degree of overcrowding and every description of industrial occupation, there is concurrently with the use of soft water a high death-rate, and with that of hard water a low. It is remarkable, moreover, that, *pari passu* with the downward degree of softness, there is an upward movement of mortality. The inference from this is not that soft water kills the people, but that hard water protects them from the untoward influences of a city life, that it gives vigour to the constitution, and enables it to resist the action of unwholesome agencies.

"Nor is it alone by the greater proportion of deaths that the action of an insalubrious influence is denoted. There are a thousand petty ailings and discomforts, which, with as subtile a force as that produced by a prolongation of east winds, renders existence uneasy without making it immediately unsafe. It is not mere life for a population that is to be desired, but a consciousness in it of tone and vigour, and of mental as well as bodily elasticity. There are those who, when they defend the qualities of a water that has been challenged, surprise us by seeming to speak as if it was to be expected that when an unwholesome water is introduced in one year into a city, in the very next ensuing years we should see already rickety children crouching at the thresholds, and the streets thronged with men with sallow faces, craving for mental and physical stimulants to relieve life of its irksomeness, and quicken it into feverish excitement while they hasten on its close." But Nature does not work in such fashion, for "when she tends towards perfection it is by slow degrees, and we mark the completed stages of the progress, or its final result, rather than the progress itself. And it is not otherwise when the course imposed upon her is one of deterioration. Each generation bears with it a downward tendency, which it bequeaths to a succeeding generation, to be again intensified and again transmitted; more frequently adding, yet sometimes substracting, a modicum till the measure is complete. It is by statistics that we strive to mark the stages, but in all statistics a main element is time."

"Upon the whole, therefore," says the physician, "I think that few who have followed this inquiry with attention, and will weigh what has been demonstrated for a hard and against a soft water, with an unchanging consistency throughout of direct as well as collateral evidence and argument in regard to both, will wonder that the commissions at Paris, Vienna, and London have finally decided in favour of a hard water. Of the new waters designed for Paris, the copious sources of St. Philbert and of Armentières, to be brought from a distance of about 80 miles, have an average hardness of 12·46 per gallon; while of those chosen for Vienna, the still more copious source of the Kaiserbrunnen, of ancient fame, and 40 miles from the city, and those of the Stixenstien and the Antonioquelle, show an average hardness per gallon of 8·82°." The hardness of the water of the Thames which is supplied to London is about 15·5°, and all these are recognized as excellent waters for the supply of large cities.

With this, says the physician, I conclude, and having seen in the course of the argument that, while on one side random assumptions have crumbled down into nothing, on the other carefully gathered proofs and authorities have accumulated into solid strength. "Perhaps never, certainly rarely, has any kindred scientific demonstration, positive as well as negative, been more complete, in any reasonable sense of what is possible with our finite means of knowledge." And now, finally, I will recapitulate the conclusions which he holds to have been established.

1. The human body needs for its structure and maintenance the supply of certain salts, among which are the carbonate and phosphate of lime, these being in a special manner required to give stability to the bones, but having also their further uses in the living economy.

2. The phosphate of lime is supplied to us in our ordinary animal and vegetable food, but is not presented to us in water.

3. The carbonate of lime, on the contrary, is not primarily presented to us in sufficient quantity in our solid food, but is contained in variable and more fitting proportions in spring and river waters.

4. It is from the carbonate of lime brought down by rivers into the sea that all marine animals derive the denser parts of their construction, the remains of which, during the progress of geological periods, have been, and continue to be, aggregated into huge expanses of limestone rock.

5. What has sufficed for the wants of these lower animals has sufficed also for those of the higher organizations, of which man is the head.

6. Positively, this is proved and confirmed by the fact that it is in the limestone districts, where the waters are more or less hard, that man has been shown to have reached his most vigorous average physical development.

7. Negatively, this is proved also by its having been found that the mortality of our principal towns increases, on a calculation of averages, in the proportion that the hardness of the waters is diminished.

8. A water containing about six grains of carbonate of lime is nowhere held to be a hard water, but is fitted for every use of domestic economy or manufacture.

9. Such a water, whether as a drink or as combined with our food, presents to us, in the most regular and constant of forms, and in its most simple, natural, and easily appropriated state, the carbonate of lime required for the healthy maintenance of the living system; while it is otherwise naturally preferable, because imbued with more agreeable qualities, and with higher refreshing and invigorating powers.

10. A lake water, independent of the consideration of its low impregnation with carbonate of lime, is further objectionable from its deficiency of air and carbonic acid, its extreme coldness in winter and tepidness in summer, its combination with peaty and other matters, the abundant presence of living animal and vegetable organisms, and its general want of sapidity and agreeableness, and, consequently, its lower refreshing powers.

11. These views, so obviously concordant in fact and reason, are consistent with the natural tastes and instincts of all peoples in all ages, have been maintained by the mass of scientific men in all countries, and have been publicly ratified through the results of repeated Government inquiries.

12. Therefore, wherever a community has a choice between a water immediately derived from springs, and thus moderately impregnated with carbonate of lime, the excellence of which no one questions, and a lake water, the defective qualities of which are denounced by many, it ought unquestionably to prefer the former, on every probable consideration of comfort, health, convenience, and, in the end, were it on no other grounds than these, of the truest economy.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of the Shareholders of this Company was held at the Company's Office, in Horseferry Road, on Friday, Oct. 6, "to transact the usual business, including the declaration of a dividend for the half year ending the 30th day of June last." Notice had also been given that at the meeting the directors would apply to the shareholders for authority to dispose of such of the company's property as is not now required for the purposes of their undertaking.—SIMON ADAMS BECK, Esq., the governor, presided.

The SECRETARY (Mr. John Orwell Phillips) having read the advertisement calling the meeting, and also the minutes of the last half-yearly general meeting of the company,

A SHAREHOLDER took exception to the minutes of the last meeting, on the ground that while it made reference to the granting of an annuity of £500 to Mr. Upward, superintendent at the Brick Lane and Curtain Road stations, on the occasion of his retirement after many years service, it made no mention of an amendment that was moved, and a division that took place upon the resolution, by which that annuity was sanctioned.

The SECRETARY pointed out that the amendment alluded to was not seconded.

The GOVERNOR confirmed the secretary's remarks, observing that the omission from the minutes of any reference to the amendment in question was therefore quite in order.

After some conversation, the accuracy of the minutes of the previous meeting was unanimously affirmed by a show of hands.

The following report and statement of accounts was presented:—

The audited accounts for the half year ending on the 30th of June last, now submitted to the proprietors, show that the anticipations of the directors expressed in previous reports, as to the beneficial results to be looked for from the working of the Beckton station, as well as from the amalgamations already concluded, are entirely realized. In furtherance of the policy adopted in the year 1868, and since so successfully prosecuted, the directors applied to Parliament in the last session, and passed "An Act for Authorizing the Gaslight and Coke Company to make a short connecting Railway from the Company's Works at Beckton to the Great Eastern Railway, and for Amalgamating the Equitable Gaslight Company with the Gaslight and Coke Company, and for Amending the Metropolis Gas Act, 1860, and the City of London Gas Act, 1868, and for other purposes," which Act received the Royal Assent on the 29th day of June last. From the day following, the amalgamation so sanctioned with the Equitable Gas Company took effect, and the directors are now in possession of the undertaking and district of that company, from which it is believed that further advantages will accrue.

Among the peculiar privileges conferred by the new Act upon the company may be mentioned the power to amalgamate with any other metropolitan gas company, without the necessity for a special application to Parliament; and this power, subject to the further approval of shareholders, the directors are prepared, in the interests of the consumer, to exercise as opportunity shall arise, if in doing so it can be demonstrated that the company's interests will also be thereby advanced.

The railway, to which the directors confidently look forward as an additional source of convenience and profit, will be commenced so soon as the requisite land has been acquired, and will, it is expected, be opened for traffic in the course of the ensuing winter.

The accident to one of the gasholders at Beckton, mentioned in the last report, was found, on investigation, to have been occasioned through defective workmanship. Its restoration is being rapidly proceeded with, and it will shortly be again available for use.

The directors have to report the discontinuance of manufacture at the Brick Lane and Curtain Road stations, and they have further the pleasure to announce that, in addition to the manufacture heretofore carried on at those stations, a large portion also of that hitherto conducted at the Westminster and Blackfriars stations has been already transferred to Beckton, with an immediate and manifest advantage to the company. With the sanction of the proprietors, the sites of the two wholly disused stations will now be sold, and the proceeds will be applied in reduction of the company's capital.

The profits of the half year enable the directors, after providing for the payment of interest on the several classes of preference shares, to declare a dividend at the rate of £10 per cent. per annum on the ordinary shares, and the directors offer to the proprietors their congratulations on so satisfactory a state of affairs.

The warrants for the dividends will be issued, as usual, fourteen days after the meeting.

THE GASLIGHT AND COKE COMPANY.

Half Year ending June 30, 1871.

No. 1.—STATEMENT OF SHARE CAPITAL, *to June 30, 1871.*

Acts of Parliament regulating the Capital of the Com.	Description of Capital.	Maximum Dividend authorized.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Amount not paid up or unissued.	Total Amount authorized.
The Gaslight and Coke Company's Act, 1868.	Share A.	10 per cent.	90,000	£10 0 0	£10 0 0	£899,990	£10	£900,000
	Share	5 per cent. preference, with option of conversion.	25,000	10 0 0	10 0 0	250,000	..	250,000
	Ditto.	Ditto.	20,000	10 0 0	8 0 0	160,000	19,774	200,000
			Amount received in anticipation of Calls			20,226		
	Ditto.	..	..	..	..	..	200,000	200,000
The City of London Gas Company's Act, 1859.	Share A.	10 per cent.	30,000	£10 0 0	£10 0 0	300,000	..	300,000
	Share B.	4 per cent.	10,000	10 0 0	10 0 0	100,000	..	100,000
The Great Central Gas Consumers Act, 1851.	Share C.	10 per cent.	20,000	10 0 0	10 0 0	200,000	..	200,000
The Equitable Gaslight Company's Act, 1842.	Share D.	10 per cent.	12,000	25 0 0	25 0 0	300,000	..	300,000
The Victoria Docks Gas Company's Act, 1857.	Share	10 per cent.	..	..	..	..	100,000	100,000
						£2,230,216	£319,784	£2,550,000

No. 1A.—STATEMENT OF LOAN CAPITAL, *on June 30, 1871.*

Acts of Parliament regulating the Capital of the Company.	Description of Loan.	Rate of Interest.	Total Amount borrowed.	Remaining to be borrowed.	Total Amount authorized.
The Gaslight and Coke Company's Act, 1868 .	Debentures.	4½ per cent.	£300,000	..	£300,000
	Ditto.	4½ per cent.	62,500	..	62,500
	Ditto.	4½ per cent.	20,000	£80,000	100,000
The City of London Gas Company's Act, 1859 .	Ditto.	4 per cent.	500	..	60,000
	Ditto.	5 per cent.	59,500		
The Great Central Gas Consumers Act, 1851 . .	Ditto.	5 per cent.	66,000	..	66,000
The Victoria Docks Gas Company's Act, 1857 . .	..	..	..	25,000	25,000
			£508,500	£105,000	£613,500

No. 2.—CAPITAL ACCOUNT, *for the Half Year ending June 30, 1871.*

Dr. *Cr.*

	Expenditure from June 24, 1868, to Dec. 31, 1870.	Expended this Half Year.	Total to June 30, 1871.
	£ s. d.	£ s. d.	£ s. d.
To Expenditure to June 24, 1868 .	..	..	1,449,483 15 8
Expenditure by Equitable Gas Co.	..	..	293,420 4 5
			1,742,904 0 1
Since June 24, 1868—			
Lands acquired, inc. law charges	112,887 10 5	74,408 3 0	187,295 13 5
Buildings, manufacturing plant, storeage, and other structures connected with manufacture .	406,408 13 7	65,326 1 10	471,734 15 5
New mains and service-pipes, inc. laying, paving, and other works connected with distribution .	115,679 6 10	11,643 15 5	127,323 2 3
Meters (additional), inc. fixing .	25,436 17 7	1,790 10 0	27,227 7 7
Parliamentary costs.	4,241 15 2	2,478 11 7	6,720 6 9
Interest on capital raised for works at Beckton.	32,464 18 9	18,416 6 4	50,881 5 1
	697,119 2 4	174,063 8 2	2,614,086 10 7
Balance of capital account			124,629 9 5
Total			2,738,716 0 0
Note.—Total outlay of capital at Beckton Works, up to Dec. 31, 1870. .			653,299 0 7
Ditto ditto, in half year to June 30, 1871			94,458 7 4
			£747,757 7 11

	Certified Receipts to Dec. 31, 1870.	Received during Half Year.	Total Receipts to June 30, 1871.
	£ s. d.	£ s. d.	£ s. d.
By Ordinary shares, of £10 each . .	1,198,445 0 0	1,545 0 0	1,199,990 0 0
B shares, of £10 each	100,000 0 0	..	100,000 0 0
C ditto, ditto	200,000 0 0	..	200,000 0 0
5 per cent. preference shares, of £10 each	245,853 0 0	4,147 0 0	250,000 0 0
Ditto ditto, second issue . . .	79,832 0 0	80,168 0 0	160,000 0 0
Amount in advance of calls . .	4,397 0 0	15,829 0 0	20,226 0 0
D shares of £25 each	300,000 0 0	..	300,000 0 0
Debentures	488,350 0 0	20,150 0 0	508,500 0 0
	2,616,877 0 0	£121,839 0 0	
Total			£2,738,716 0 0

No. 3.—REVENUE ACCOUNT, *for the Half Year ending June 30, 1871.*

Dr. *Cr.*

	£ s. d.	£ s. d.
To Manufacture of gas—		
Coals, including carriage, trimming, and dues, &c. (*see* Account No. 6)	162,963 3 7	
Purifying materials, water, &c. . . .	3,548 13 6	
Salaries of superintendents and officers at works	3,579 8 9	
Wages at works (manufacture)	35,210 9 1	
Repairs and maintenance of works and plant, including renewal of retorts, machines, apparatus, materials, and labour	17,481 19 11	
	222,783 14 10	
Less old materials sold	953 7 8	
		221,830 7 2
Distribution of gas—		
Repair, maintenance, and renewal of mains and service-pipes, including materials, laying and paving, and labour	11,487 10 7	
Salaries of inspectors, assistant inspectors, and clerks in Light Office	3,421 6 10	
Meters—repairing, renewing, and refixing. .	5,288 12 8	
		20,197 10 1
Public lamps—		
Lighting and repairing.	..	4,582 19 5
Rents, rates, and taxes—		
Rents	2,587 13 1	
Rates and taxes	6,931 18 11	
		9,519 12 0
Management—		
Directors allowance	3,315 14 9	
Salaries of secretary and office clerks . . .	2,426 5 11	
Collectors commission	4,668 12 6	
Stationery, printing, and general charges . .	2,242 17 5	
Company's auditors	205 13 0	
		12,859 3 7
Public officers (*Company's proportion*)—		
Gas referees expenses		
Ditto remuneration		
Chief gas examiner's ditto	..	698 14 3
Official auditor's ditto		
Law and parliamentary charges—		
Law	641 5 3	
Parliamentary (*oppositions*)	83 15 9	
		725 1 0
Depreciation-fund for works on leasehold lands	..	100 0 0
Depreciation, leasehold propty. (late Equitable Co.)	..	364 10 4
Superannuation allowances under amalgamation schemes and annuities.	..	3,014 17 0
Bad debts	..	1,517 0 8
Sick-fund	..	303 1 8
		275,712 17 2
Balance carried to net revenue account		99,935 14 1
		£375,648 11 3

	£ s. d.	£ s. d.
By Sale of gas—		
Common gas (1,297,227,000 cubic feet), at 3s.9d. per 1000 cubic feet (16-candle gas) . . .	243,230 1 6	
Cannel gas (145,589,000 cubic feet), at 5s. 5d. per 1000 cubic feet (23-candle gas) . . .	39,430 6 6	
Cannel gas (21,242,000 cubic feet), at 5s. 3d. per 1000 cubic feet (20-candle gas) . . .	5,575 19 8	
Public lighting and under contracts . . .	26,766 6 7	
		315,002 14 3
Rental of meters	..	2,869 7 0
Residual products—		
Coke (Account No. 7)	42,203 4 3	
Breeze	493 9 11	
Tar	7,659 12 8	
Ammoniacal liquor	5,730 3 8	
		56,086 10 6
Rents	..	1,625 7 0
Transfer fees, &c.	..	64 12 6
		£375,648 11 3

Dr. No. 4.—NET REVENUE ACCOUNT, *for the Half Year ending June* 30, 1871. *Cr.*

	£ s. d.		£ s. d.	£ s. d.
To interest on temporary loan (balance)	437 7 2	By Balance of net revenue, Dec. 31, 1870	52,377 4 7	
Dividend on B shares, at 4 per cent.	2,000 0 0	Less dividend declared for the half year ending that day	46,802 13 3	
Ditto on C ditto, at 10 ditto	10,000 0 0			5,574 11 4
Ditto on D ditto, at 10 ditto	15,000 0 0	Balance from revenue account, No. 3		99,935 14 1
Interest on debentures accrued to June 30, 1871	3,147 10 0			
Defalcation account (Great Central Gas Consumers Company)	2,500 0 0			
	33,084 17 2			
Balance of net revenue applicable to dividend on ordinary stock	72,425 8 3			
	£105,510 5 5			£105,510 5 5

No. 5.—INSURANCE-FUND ACCOUNT.

	£ s. d.		£ s. d.
To balance on June 30, 1871	29,776 2 11	Reserved fund and accumulations of Equitable Gas Company transferred on amalgamation—	
		Invested in London and North-Western Debenture Stock	10,413 0 0
		On deposit at bankers	19,363 2 11
	£29,776 2 11		£29,776 2 11

Dr. No. 5A.—DEPRECIATION-FUND ACCOUNT (for Works on Leasehold Lands), *for the Half Year ending June* 30, 1871. *Cr.*

	£ s. d.		£ s. d.
To Balance	2,073 2 0	By Balance on Dec. 31, 1870	1,943 18 8
		Brought from revenue account	100 0 0
		Interest on amount invested	29 3 4
	£2,073 2 0		£2,073 2 0

Dr. No. 5B.—DEFALCATION ACCOUNT (Great Central Gas Consumers Company), *June* 30, 1871. *Cr.*

	£ s. d.		£ s. d.
To Balance on Dec. 31, 1870	24,858 7 5	By Amount brought from net revenue account, for the half year to June 30, 1871	2,500 0 0
		Balance	22,358 7 5
	£24,858 7 5		£24,858 7 5

No. 6.—STATEMENT OF COALS USED, &c., *during the Half Year ending June* 30, 1871.

Description of Coal.	In Store, Dec. 31, 1870.	Received during Half Year.	Used during Half Year.	In Store, June 30, 1871.
	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.
Common	24,125 5	162,949 4	169,828 17	17,245 12
Cannel	7,470 12	38,194 6	27,063 5	18,601 13

No. 7.—STATEMENT OF RESIDUAL PRODUCTS *made and disposed of during the Half Year ending June* 30, 1871.

Description of Residual.		In Store, Dec. 31, 1870.	Made during Half Year.	Used in Manufacture during Half Year.	Sold during Half Year.	In Store, June 30, 1871.
Coke—						
Common	chaldrons.	5,673½	186,254½	60,995½	128,918½	2,014½
Cannel						556½
Breeze	,,	2,360 13-40ths	16,794 37-40ths	3,057	15,542	
Tar	gallons.	234,323	2,097,697	800	1,964,184	367,036
Ammoniacal liquor	,,	149,463	3,792,776	..	3,665,868	276,371

Dr. GENERAL BALANCE-SHEET, *on June* 30, 1871. *Cr.*

	£ s. d.		£ s. d.	£ s. d.
To Capital account—		By Cash at bankers	..	48,619 11 3
Balance at credit thereof (Account No. 2)	124,629 9 5	Ditto on deposit at interest	..	25,071 0 7
Net revenue account—		Ditto invested at ditto	..	12,486 2 0
Balance at credit thereof (Account No. 4)	72,425 8 3			
Insurance-fund account—		Stores on hand, viz.:—		
Balance at credit thereof (Account No. 5)	29,776 2 11	Coals	41,865 10 5	
Depreciation-fund (for works on leasehold lands)—		Coke and breeze	624 16 2	
Balance at credit thereof (Account No. 5A)	2,073 2 0	Tar and other products	1,503 12 1	
Unpaid dividends	6,543 3 0	Sundry stores	12,498 12 2	
Dividends accrued due, and provided for to June 30, 1871	26,437 10 0			56,492 10 10
Interest accrued due, and provided for to June 30, 1871	19,156 2 6	Outstanding accounts due to the company, viz.:—		
Amount due for coals and to sundry tradesmen and others	26,877 19 7	Light account	123,744 10 0	
Ditto due for wages	2,177 0 11	Coke and other products	5,066 0 6	
Benevolent-fund	1,181 5 0	Sundry accounts	16,557 0 4	
				145,367 10 10
		Ship *Dispatch*	..	882 0 8
		Defalcation account (Great Central Company)—		
		Balance at debit thereof (Account No. 5B)	..	22,358 7 5
	£311,277 3 7			£311,277 3 7

I certify that the above accounts are correct, and that the balance of net revenue, for the half year ending June 30, 1871, is £72,425 8s. 3d., and that such amount, subject to deduction for income-tax, is applicable to payment of dividend on the ordinary stock.

Sept. 27, 1871. (Signed) CHAS. H. PARKES, *Official Auditor.*

The GOVERNOR, in moving the adoption of the report, said: It is my pleasant duty, in submitting this report for your approval, to congratulate you on the fact that the affairs of the company are now in so satisfactory a condition as to warrant us in declaring a dividend of 10 per cent. on our ordinary shares. Since we last met we have completed our amalgamation with the Equitable Gas-light Company, and I can only say that while I regret that so many of the directors of that company should have retired, I am glad to be able to assure you that the board of directors continues as harmonious as ever, and that they are actuated only by a unanimous desire to maintain and promote to the best of their power the interests of the company which they have the honour to serve. I do not like to make long speeches, and, therefore, I will lay before you a few figures and facts which will serve better to show you the position in which we stand than anything else I could say. This will be seen from a comparison of the working of the Beckton with our working of the old Brick Lane and Curtain Road stations. The comparison as regards the Beckton station only applies to one quarter, from Lady-day to Midsummer—to the 30th of June last—but it will be sufficient to show you that we have reason to entertain good hopes as to the success of our scheme. The works at the Brick Lane and Curtain Road stations closed for manufacture on the 31st of March, and during the quarter ending the 30th of June, 1870, there were carbonized at these two stations 11,416 tons of coals, at a cost of £10,826, less the amount realized by the sale of products, which, being £3600, would reduce the cost to £7226. The net cost, after deducting products, was thus about 12s. 8d. per ton of coals. At Beckton, during the quarter ending the 30th of June of the present year, 20,000 tons of coals were carbonized, at a cost of £12,982, less £4557 realized by the sale of products, which brings the net cost down to £8425, or to 8s. 5d. per ton. So that, comparing the two results, we have thus a saving of 4s. 3d. per ton in favour of Beckton. The wages paid for carbonizing the 11,416 tons of coals at the Brick Lane and Curtain Road stations amounted to £3039, or, on the average, to 5s. 4d. per ton. The wages for carbonizing the 20,000 at Beckton amounted to £2867, or to an average of 2s. 10d. per ton; thus showing, as compared with the wages at the Brick Lane and Curtain Road stations, a saving in wages to the extent of 2s. 6d. per ton, while the total saving in favour of Beckton for the three months amounts to 6s. 9d. per ton. I wished to satisfy myself that the works at Beckton had not been supplying the works at the other stations, and I find that during the quarter of 1870 we made at Blackfriars, Bow, and Westminster, 383 millions of cubic feet of gas, while the quantity made at these stations during the corresponding quarter of 1871 was 377 millions of cubic feet, being a diminution of only 6 millions. So that, practically, the whole 20,000 tons of coals carbonized at Beckton has come to us in addition to what we had before—showing, in fact, that the consumers will take almost any quantity we can give them. We have always found that, whatever we have been able to give, the consumers have taken and paid for. Our increased rental, taking the Equitable and Victoria Docks stations into account, is £24,000 and more. The quantity of cannel used at the Brick Lane and Curtain Road stations amounted sometimes to 14 per cent., whilst at Beckton it is now 5 per cent. Remembering that the 20,000 tons represent the quantity of coals carbonized at Beckton during the summer quarter, we may expect, when the works are in full operation, that the quantity for the year will amount to about 120,000 tons. I have, therefore, every antici-

pation that we shall go on flourishing; and I am sure you will all be delighted to find that the anticipations of engineers and other scientific men, as to our being able to send gas a distance of 11 miles, have met with so satisfactory a response in the fact that the thing has been done—that it has been done, too, with the greatest ease possible, with very little increased pressure, and that the supply has never failed. We send it from that station as readily as from Bow or any other station. I therefore believe that we shall go on prospering, not only as we have hitherto done, but in an increasing ratio. There is one thing about which I should remind you with regard to next half year, and that is, that we shall then have to pay our dividend upon an increased capital. We have not the least fear, however, but that we shall be able to continue our 10 per cent. dividend. Our profits this half year much more than pay that dividend, and we shall carry over a handsome balance to next year. Our rental this half year is £315,000, as against £234,000 for the corresponding quarter of last year; but then we have to take into account about £55,000 for the Equitable and Victoria Docks stations; so that our increase of rental is about £24,000 or £25,000. With regard to the sale of coke, we had apprehended that at Beckton we should have a bad bargain in that matter, and we entered into a contract with a large house to take the whole of the coke from that station at a low price; but the carbonizing is so good that there is an increase of 10 per cent. on the quantity sold at the new station, which thus diminishes the loss which the low price would otherwise have occasioned, there being no difficulty in finding a market for it. There is another question in connexion with Beckton, independently of the laughs and sneers which some engineers thought proper to indulge in, with regard to our being able to carry the gas 11 miles. Many of my friends said to me, "How can you think of laying out so much money on going to Beckton, when you cannot pay your 10 per cent. dividend?" My answer was that the difference in the savings that would be effected at the new, as compared with the old stations, would of itself enable us to pay the 10 per cent. dividend; and we now find that we can do it; but, in addition to that, it has to be borne in mind that when we get rid of the old stations we shall decrease our capital, and have so much the less to pay upon dividend. There is, therefore, every prospect of our being able to continue paying the 10 per cent. In every way, looking at the interests of this company, it will be seen that the ideas we entertained regarding our scheme turn out to be not so chimerical after all. I believe that our anticipations will be realized, and may be more than realized; and when it is remembered that this improved working of our undertaking comes out upon an increased illuminating power in our gas from 14 to 16 candles, and a decreased price from 4s. to 3s. 9d., surely nothing can be more satisfactory. The governor concluded his observations by moving the adoption of the report of the directors for the half year.

The Hon. RICHARD HOWE BROWNE (deputy-governor) seconded the motion.

Mr. YOOL, while supporting the motion for the adoption of the report, and expressing his approval of the policy which the directors had hitherto pursued in upholding the interests of the company desired to say a word with regard to that paragraph in the report which related to the power taken by the company under the Act of Parliament to amalgamate with any other metropolitan gas company. This power, subject to the approval of the shareholders, the directors were prepared, in the interests of the consumers to exercise, as opportunity might arise, if it could be shown that by such amalgamation the company's interests would be advanced. The question arose, how far such companies, in amalgamating with this company, might be entitled to receive those advantages which had already been conceded to others. He did not conceive that either the directors or the shareholders generally were at all prepared to admit that any of those companies were in a position to claim advantages over the original shareholders of The Gaslight and Coke Company. The original shareholders had taken the whole of the risks thus far, and he should be sorry to see the existing amount of preference and guarantee stock increased.

Mr. JOHNSON spoke to the same effect, expressing a hope that no such amalgamation would be hastily accomplished—that no such amalgamation would be entered into until the shareholders had an opportunity of considering the matter fully, and that in any case such amalgamation, if accomplished at all, would be accomplished on fair terms with the original shareholders of the present company. This company was in a prosperous condition, and any other company desiring to amalgamate with it ought to do so on something like equal terms.

Mr. COPPEN expressed a similar opinion with regard to the position and claims of the original shareholders. It was evidently the unanimous opinion of the meeting that the report which had been submitted for their approval was a most satisfactory one, and that the directors had done wonders in the short space of time which had elapsed since the Beckton works came into operation. With regard, however, to amalgamating with other companies, it behoved this company to look to what it had done in order to establish it in its present position, and the directors ought to be very chary about entering into new relations, and to take care that in any amalgamation that might be contemplated the original shareholders should not be placed at a disadvantage, or be deprived of the preference to which the risks they had hitherto undergone so fairly entitled them.

The GOVERNOR expressed a hope that after the foresight the directors had shown in the management of the affairs of the company, the proprietors would give them credit for discretion enough to take care that in any amalgamation that might be deemed desirable, the interests of the company and of the original shareholders would not suffer. In any steps they had taken hitherto, the directors had been careful to consult the views of the shareholders, and the shareholders might rely upon it that when any such case arose, it would be duly submitted for their consideration before any final decision was come to in the matter.

The motion for the adoption of the report was then put to the meeting, and unanimously carried.

The motion to declare a dividend of 10 per cent. on the original shares, as recommended in the report, was also unanimously carried.

The meeting then unanimously agreed to the application of the directors for authority to dispose of such of the company's property as is not now required for the purpose of their undertaking—namely, the Brick Lane and Curtain Road stations, and the offices in Adam Street and John Street, Adelphi.

A hearty vote of thanks to the directors and to Mr. Beck, the governor of the company, for presiding, terminated the proceedings.

COMMERCIAL GAS COMPANY.

The Ordinary Half-Yearly Meeting of the Shareholders of this Company was held at the London Tavern, on Friday, Oct. 6—JAMES HOLBERT WILSON, Esq., in the chair.

The CHAIRMAN, prior to commencing the business of the day, read a letter from the Rev. John B. M. Butler, the son of their late chairman, Charles S. Butler, Esq., expressing his grateful feelings, and those of his mother and family, for the resolution of condolence unanimously passed at the last meeting of proprietors in April last. The letter was directed to be entered on the minutes of the proceedings.

The SECRETARY (Mr. Jaques) having read the advertisement convening the present meeting, the minutes were read and approved, and the corporate seal affixed to the register of shareholders.

The following report and statement of accounts were presented:—

The directors report that, during the half year ending the 30th of June last, a net profit of £22,786 1s. 5d. has been realized, and they recommend that a dividend of £5 per cent. for the half year (less income-tax) be declared.

The directors have announced to the public that the price of gas was reduced from 4s. to 3s. 9d. per 1000 cubic feet from Midsummer last.

STATEMENT OF ACCOUNTS,

Showing the Actual State and Conditions of the Concerns of the Commercial Gas Company, for the Six Months ending the 30th day of June, 1871.

I. CAPITAL.—*State of the Account at the End of the above Six Months.*

Statute, or Authority, under which raised.	Number of Shares.	Amount per Share.	Paid up per Share.	Total Paid up.	Total Capital.
Shares	17,486-2/5ths-1/10th-1/20th 3-4/5ths-1/10th	£25 0 0	£25 0 0 Various.	£437,163 15 0 66 10 0	
COMMERCIAL GAS ACT, 15 & 16 Victoria, cap. 135.	17,490-2/5ths 1/20th				£437,230 5 0

II. REVENUE.—*Account during the above Six Months.*

RECEIPT.			EXPENDITURE.		
Sale of gas—			Management—		
At 4s. per 1000 feet	£63,222 11 10		Directors allowances	£750 0 0	
Public lighting and contracts	7,709 4 11		Salaries of secretary and clerks	1,728 4 0	
	£70,931 16 9		Collectors commission and pay	884 11 9	
Sale of residual products—			Rent, rates, and taxes of offices	395 17 8	
Coke	£10,387 7 8		Stationery, printing, and general charges	583 14 2	
Breeze	18 18 9		Payment to auditors	75 0 0	
Tar	854 12 2			£4,417 7 7	
Ammoniacal liquid	1,160 7 3		Manufacture of gas—		
	12,421 5 10		Coals, including carriage, dues, &c.	£33,871 3 0	
Miscellaneous receipts	352 1 1		Purifying materials	1,676 13 4	
			Supervision and labour	11,223 5 3	
			Ordinary repair and maintenance of premises	6,193 7 9	
			Rents, rates, and taxes of manufactory	1,807 1 5	
				54,171 10 9	
			Distribution, including service-mains, pipes, &c.—		
			Ordinary repair and maintenance	2,058 5 8	
			Meters—		
			Restoring and replacing	271 18 3	
			Balance for shareholders profit	22,786 1 5	
	£83,705 3 8			£83,705 3 8	

Balance of shareholders profit as above	£22,786 1 5
Required for dividend	21,861 10 3
Balance	£924 11 2

Reserve-fund, £31,069 9s. 2d.; invested in £33,830 1s. 9d. Consols.

The CHAIRMAN: Gentlemen, in moving the adoption of the report, I shall, in accordance with our usual custom, proceed to make a few observations. As, however, our operations during the past half year have been of the ordinary routine character, I shall only have to trespass for a very short time upon your time and attention. Let me commence by congratulating you upon the continued prosperity of the company. True it is we have not brought over this half year so large a surplus as on many former occasions, but the decrease admits of a very easy explanation, and, I think, an explanation which will be quite satisfactory to you. You are aware that at Midsummer last we reduced the price of our gas from 4s. to 3s. 9d. per 1000 cubic feet. According to the experience of all other companies, this reduction of price ought, in the ensuing winter, to bring us an increased consumption of gas, and I have no doubt that it will do so. We, therefore, under the advice of our engineer, have prepared to meet the expected increase by substituting large mains for small mains in various parts of our district. For instance, one main of 10 inches has been laid in the Mile End Road to Bow, and corresponding changes have been made in other places. By the expenditure thus incurred we shall be able to supply all the gas that can be demanded of us without increasing our initial pressure, and therefore without increasing our leakage. This I need scarcely say is a very material consideration. Our leakage formerly was very large; it is now very small—a little more during the last six months, on account of the relaying of the mains that has taken place, but nothing like what it was in former years. Our works, I am happy to say, are in very excellent order. One of our old retort-houses has been substantially repaired, and is now quite in a position to render a very large addition to our carbonizing department. We are, however, contemplating certain additions which will enable us to receive and store our coal at much less expense than hitherto. We have not entered upon that work as yet, but shall do so in a very short time, and by that means hope to effect an important economy in our arrangements respecting the coals. I may for one moment refer to the question of the residual products. It is not often that this question is brought before you; for you have repeatedly been told from this chair, in years gone by, that we are not, as a company, in a very favourable position for disposing of our coke. In this item there has been a considerable falling off

during the past six months, partly occasioned by an unfair competition which has existed. Parties have said—I do not guarantee the truth of their statement—that they have entered into large contracts with The Gaslight and Coke Company for the purchase of their coke, and they have been selling it in our district for 6s. and 7s. a chaldron. Whether this coke is a portion of the surplus stock from the Brick Lane station of that company, which they were anxious to get rid of prior to the sale of those works, I do not know; but I trust the circumstance to which I have referred will not occur again, but that we may be allowed to go on in our usual manner. It will not even then be very favourable to us, because the make of gas will still be continued at the works formerly belonging to the Great Central Company. There are also the Independent and other companies near to us, and these facts militate against our disposing of coke on advantageous terms. But while this is the case, I may tell you we have made a favourable contract for our ammoniacal liquor. Owing to the war in France, it appears that the price of ammonia has largely increased, and though the advantage of our new contract is not shown in our present accounts, it will form a feature in future ones. With reference to breeze, we have been obliged to give it away, the demand for it having been reduced to such a low point we have not been able to obtain a price for it. We happen to know that one large company in London has been obliged to pay £500 or £600 to have it removed, because it filled up their works. When we were in this room last half year, I mentioned to you that some new gas legislation was intended, that we had had several interviews with the Board of Trade upon the subject, and that queries had been put to us, which we had answered. I am happy to say the answers of the companies were so satisfactory that no further progress was made with the bills during the past session. These are very early days as yet to say whether anything fresh is contemplated for next year; but you may be assured, if there should be, we shall give to it our most earnest consideration, and I trust we may come out as well as we have done this year. Subject to your having your statutory dividend of 10 per cent. well secured to you, we are anxious to give the public all the benefit they can possibly have in the way of reduction in the price of gas; but the interest of those who have invested their capital in this concern is paramount. That must not be put in jeopardy; it must not be trifled with. There is one point, gentlemen, to which I may just refer before taking my seat again. It relates to a matter which as yet is only under the consideration of the board—viz., the conversion of the share capital of the company into stock. We have thought that if this were done it would simplify our accounts, and that it might be of advantage to our proprietors. At the present time they can only dispose of a share, but if the shares were converted into stock they might, if desirous to do so, dispose of a smaller portion of their interest in the company. Of course there would be a limit, but it would be much lower than it is now—perhaps £10 instead of £25. I will not say more upon the subject, because it is still under the consideration of the board; but I shall be happy to hear any remarks you may have to make, and no resolution will be proposed to-day upon it. We shall give it our most careful attention, and if we find there are difficulties in the way, or that it will militate against the value of the shares, or anything of that kind, we shall not proceed further. If, however, after weighing the question with due deliberation, we think it will be advantageous to you, and a desirable step to take, we shall bring the question forward by resolution at the next meeting, of which notice will be given to you. We have the power, under our Acts of Parliament, so to effect the conversion of our shares; it requires some formalities, and your consent must be given to it. And now, gentlemen, I believe I have nothing further to add except that I shall be happy to listen to the observations of any proprietor desirous to address the meeting. I move—"That the report and accounts be received and adopted, and entered on the minutes."

Mr. BRUSHFIELD (deputy chairman) seconded the motion.

Mr. SAMUELS: I have seen accounts in the newspapers lately that serious defalcations have occurred in the accounts of a large provincial gas company; and although I have every confidence, as, I believe, every proprietor present has, in the integrity of the officers of this company, I think it right to allude to the matter, and remind you that in the face of these revelations—I think this is the third case which has been made public—it behoves the directors to exercise a strict supervision of our affairs, and to see that proper securities are taken with the servants of the company. I dare say the board do give great attention to this point, but it may be, perhaps, as well that the shareholders should just recall the importance of it to their memory.

The CHAIRMAN: I am very much obliged to you for having mentioned it, because I think I can give an answer to the inquiry, which will perfectly satisfy you. A few months ago, we consulted one of the first accountants in London, as to the mode in which our accounts are kept, and he gave it as his opinion that, with two or three little alterations which he suggested, and which have since been adopted, nothing could be better. We always take security from all our officers.

The motion was put, and carried unanimously.

The CHAIRMAN moved—"That, pursuant to the recommendation of the board of directors, a dividend of 5 per cent. for the half year ending the 30th of June last, less income-tax, be declared, and that cheques be forwarded to the shareholders on Monday, the 9th inst."

The motion, having been seconded was put, and carried unanimously.

A SHAREHOLDER: I think we should be guilty of a dereliction of duty if we did not give a vote of thanks to our directors for their successful exertions on our behalf, and I have much pleasure in proposing such a resolution.

Mr. RHODES seconded the motion, which was cordially adopted.

The CHAIRMAN: Gentlemen, let me thank you, on behalf of myself and the board of directors, for the unanimity with which you have passed this resolution. It is always pleasing to receive such a mark of your approbation, and I hope in future years we may receive it from you with as much cordiality as it has met to-day.

On the motion of Mr. RHODES, a vote of thanks was given to the auditors for their attention to the duties of their office.

Mr. WEBB acknowledged the vote for himself and colleagues.

A vote of thanks was also unanimously given to the secretary and engineer of the company for their valuable services, on the motion of Mr. RHODES, seconded by Mr. COXFORD.

The SECRETARY: Gentlemen, I beg to acknowledge the kindness you have shown me in passing this resolution. I hope I shall continue to deserve your approval.

The ENGINEER (Mr. R. Jones): Gentlemen, I beg to supplement the remarks of Mr. Jaques by saying that I am greatly obliged to you personally for this acknowledgment of my services.

The proceedings then terminated.

ALLIANCE AND DUBLIN CONSUMERS GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on Saturday, Sept. 30, at the Company's Offices, Grafton Street, Dublin—Mr. DENIS MOYLAN, D.L., chairman of the board of directors, presiding.

The SECRETARY (Mr. Stevenson) read the following report for the past half year:—

The directors herewith submit to the proprietors the accounts showing the result of the company's operations during the half year ending the 30th of June last, and which they have no doubt will be regarded as satisfactory.

In gas-rental there is a large increase over the corresponding period of last year, whilst the sales of secondary products have improved in the same proportion.

The board are happy to say that all the appliances for the economical production of gas, which have recently been brought into action at the several stations, continue to justify the anticipations of your officers; and that the improvements and extensions which have occupied so much of the attention of the board during the past three years, and which are now virtually brought to a close, will enable them to meet all the requirements of the public, both in the city and suburban districts, in such a manner as to preclude all reasonable ground for complaint.

The erection of the new gasholder is being rapidly proceeded with, and on the completion of this important adjunct to the company's plant, the necessity for furthur outlay of capital on additional work will be in a great measure, if not altogether, obviated.

In their last report, the board informed the proprietors that a considerable quantity of coal had been damaged in store by heating and spontaneous combustion, and that the company in which the coal was insured had expressed a desire to have the matter submitted to arbitration. To this proposition the board readily assented, and they are happy to say that, after a careful and searching inquiry before three of the most distinguished mercantile gentlemen in the city—namely, Mr. Colvill, the governor of the Bank of Ireland, Mr. J. Blood, and Mr. Frederick Stokes—the full amount of the sum claimed was awarded to the company.

With respect to the bill promoted by the company in the last session of Parliament, the board have to report that it came before a select committee of the House of Commons on the 8th of June, and after an inquiry of six days duration, in the course of which evidence of the most conclusive character—embodying the opinions of gentlemen of great eminence and authority in the science of gas lighting—was adduced to show that the burner defined in the contract was unsuitable for developing the full value of the company's gas. On the close of the case for the promoters, a proposition (by agreement with the gentlemen representing the corporation on the one hand, and the gentlemen representing the citizens on the other) was submitted to the committee to raise the standard of illuminating power from 16 to 20 candles, substituting a fishtail for the objectionable Argand burner, and raising the price of 5s. 6d. per 1000 feet for the first two years, to be reduced to 5s. 4d. the year after, and finally to 5s. This arrangement will come into operation on the 1st of July, 1872, and as it may be regarded as a parliamentary recognition of a principle which both the corporation and the gas consumers strenuously asserted in the early stages of the gas agitation in Dublin, the board entertain a confident expectation that its adoption will be satisfactory to all parties, and render future appeals to Parliament unnecessary.

The board regret having to report that since the last meeting of proprietors they have been deprived of the valuable assistance of Mr. Thomas M. Gresham and Mr. M. B. Mullins, two gentlemen who took a deep interest in the welfare and success of the company. Mr. Gresham was one of the original promoters of the undertaking, and an active member of the directory up to within a very brief period of his decease; and the board deeply sympathize with his family and friends in the loss of one for whom all who knew him entertained sentiments of respect and esteem.

The profit and loss account exhibits a net gain on the operations of the half year of £17,907 18s. 11d., from which the board recommend the payment of a dividend free of income-tax, at the rate of 8 per cent. per annum, the balance, £597 18s. 11d., to be carried to the contingent-fund.

The accounts, which were as follows, were taken as read:—

Dr. Balance-Sheet for the Half Year ending June 30, 1871. Cr.

To Purchase of gas-works, and amount expended as per account, Dec. 31 last	£580,076	0	7	By Proprietor's stock— Class A	£152,000	0	0
Expended this half year.	17,169	17	8	Class B	55,000	0	0
	597,245	18	3	Class C, No. 1	135,000	0	0
Stores—stock on hands .	5,681	3	10	Class C, No. 2	90,750	0	0
Coal ditto	23,838	1	6	Company's bonds at 4½ per cent.	67,500	0	0
Coke, breeze, and tar, do.	492	6	4	Company's Bonds at 5 per cent.	80,000	0	0
Petty cash on hands .	19	13	10	Contingent-fund	17,927	5	8
Due for gas and meter rent	35,463	2	7	Gain this half year	17,907	18	11
Do. coke, breeze, and tar	3,024	4	9	Insurance-fund	665	9	10
Do. fittings.	782	2	0	Bills payable	12,722	0	10
Do. Rent of Fittings .	64	4	5	Debts due to sundry persons	42,631	7	11
Due by sundry persons (advanced on contracts, &c.)	8,649	15	8	Unclaimed dividends	1,377	12	0
				Deposit account	1,778	18	0
	£675,260	13	2		£675,260	13	2

Abstract of Revenue and Expenditure for the Half Year ending June 30, 1871.

By Revenue derived from gas and meter rent	£68,200	5	3
Sales of products, less stock on hands, December 31 last	15,225	10	2
Transfer fees	49	0	0
			£83,474 15 5
To Coals carbonized, less amount received from insurance company for loss sustained by fire	36,085	8	7
Wages	7,635	7	5
Salaries—directors, secretary, chief engineer, engineers, and clerks	2,475	0	0
Charges, collectors commission, &c.	3,638	7	2
Rent and taxes	2,664	12	1
Purifying material	437	5	0
Wear and tear.	6,392	10	8
,, Repairing meters	925	0	0
Interest on Bonds	3,445	8	6
Law costs	116	2	2
Interest account	575	16	9
Bad debts	1,175	18	2
			65,566 16 6
Net gain			£17,907 18 11

The CHAIRMAN: The report submitted by the board for your approval will, I trust, appear satisfactory. The increase of rental and secondary products is considerable, and has enabled the directors to declare the usual dividend of 8 per cent., and discharge the increased city rate, leaving a moderate sum to be carried forward. The works at the different stations are in the most perfect order and condition, and will bear comparison with any similar establishments in the United Kingdom. Lately the British Association of Gas Managers held their annual meeting in this city, when they visited the works at Brunswick Street and Sir John's Quay. Those intelligent and well-informed gentlemen expressed their admiration and approval of our arrangements and system. The monster gasholder now being erected will afford the company an unlimited supply of gas. During the past winter much inconvenience was experienced for want of gas storage; indeed, on many occasions the supply had to go direct from the retorts. The contractor is bound to complete and deliver up the vessel before the end of November. The claim of the company upon the insurance office for damaged coal was, by mutual consent, submitted for arbitration to the three eminent men named in the report, who unanimously awarded nearly the entire amount claimed. The bill promoted in last session of Parliament resulted in a compromise between the company, the city authorities, and the representatives of consumers, agreeing that the illuminating standard be increased to 20 candles, with an equivalent advance in price. It is hoped that this arrangement will give satisfaction to all concerned. The death of two esteemed and respected members of the board has occurred since last meeting, one of whom—Mr. Gresham—was an original promoter of the gas company, and always took an active part in the management, with advantage to the company. Mr. Mullins, the junior member of the board, was an experienced engineer, who gave sound and valuable advice on all occasions. I beg to move the adoption of the report and accounts.

Dr. WALLER said he found in the balance-sheet that more than half a year's rent for gas and meter hire was due. He presumed that now the secretary could give a more satisfactory account of the matter.

The SECRETARY said the account referred to by Dr. Waller represented the state of things on the 30th of June, when only a part of the current gas revenue was collected. Since then the collection had gone on, and at present there was not more than nine or ten thousand pounds due for gas to the company.

Dr. WALLER considered the reply of the secretary very satisfactory. Passing from that he wished to bring the attention of the meeting and of the public

to a matter which he thought of grave moment. He would do this for the purpose of eliciting such answer as the respected secretary could give on the subject. He held in his hand an extract from a report presented to the corporation on the 16th of September, and which appeared in the morning journals of the 18th. He found, under the head of "Supply of Gas to the City," the committee passed the following resolution :—

That the gas supply of the city has been highly unsatisfactory for some time past, the illuminating power being frequently below the minimum standard of 16 candles; that the gas company do now get notice that if at any time after this date the gas supply shall be below the minimum standard, this committee will be constrained not only to put on the fine provided in such case, but will deduct the difference in value of the article supplied, which course can be also adopted by private consumers; that the gas company's inspector be directed not to make the weekly average of the illuminating power of the gas in future, but to give the notice required by the Legislature preparatory to levying the fine in every instance where the gas shall be below the minimum standard of 16 candles, as provided by the Act and the gas company's contract.

He (Dr. Waller) saw nothing more on the subject in the papers on the matter, except that such a notice was given to the gas company, and he would be glad to know how far a statement of the sort made in the committee's report—a statement which so gravely interested the gas consumers of the city—could be explained.

The SECRETARY said the company had sent a reply to the committee in answer to the resolution referred to by Dr. Waller. That reply he would read :—

114, *Grafton Street, Sept.* 23, 1871.

Dear Sir,—I beg to acknowledge the receipt of your communication of the 16th instant, enclosing a copy of a resolution passed by committee No. 1, upon the same day, conveying amongst other statements with which the directors are not now called upon to deal, an allegation to the effect that the gas supply to the city has been for some time past highly unsatisfactory, the illuminating power being frequently below the minimum standard, 16 candles. In reply, I am directed to state that the board have received this intimation with surprise, as they are in a position to prove that the illuminating power of the gas supplied to the city has been for some time past considerably in excess of the standard defined by the company's Act, and fully up to the requirements of the contract for the public lighting, with the exception of a temporary deficiency during about half an hour on one evening, caused by an accident at the works. No instance of defective illuminating power, or unsatisfactory supply, had existed to the knowledge or belief of the directors of the gas company, or their officials, and I am to request that your committee will favour the board with the dates and other particulars of the occasions on which it is alleged that the standard was not maintained. I am also to suggest that it would tend to prevent the recurrence of misunderstandings upon this point, and be in accordance with the practice in London, as provided by the Metropolis Gas Act, and elsewhere, were your committee to give directions that the gas company be furnished with particulars of the daily testings, which no doubt are made by their officers.—I remain, dear sir, yours faithfully, JOHN STEVENSON, Secretary.

J. C. Reynolds, Esq., Secretary, Committee No. 1, Corporation of Dublin.

To that letter the following note, which could scarcely be called a reply, was sent :—

Corporation of Dublin, Secretary's Office, City Hall, Committee No. 1, *Dublin, Sept.* 23, 1871.

Dear Sir,—In reply to your letter of the 25th inst., I am directed to inform you that the committee passed the following resolution on the 23d inst. :—"The gas company are to be informed that the quality of gas has been considerably improved since the resolution of the committee referred to in Mr. Stevenson's communication. The company will receive notification whenever the illuminating power of the gas supplied is below the minimum standard."—I am, dear sir, yours faithfully,

(Signed) J. C. REYNOLDS, Secretary.

J. Stevenson, Esq., Secretary, Alliance Gas Company.

With respect to the allegation that the gas was much better in consequence of the communication from the committee, he (the secretary) could only say that the gas was not in the smallest degree better after the date of the communication; on the contrary, the gas was rather better previous to the communication than subsequently.

Dr. WALLER : Then, the state of affairs was this—There was an allegation on the part of the committee, based on the tests established by them as to the illuminating power of the gas, and a contradictory allegation by the testors of this company. Between those two the gas consumers stood independent and neutral. He would not himself undertake to pronounce one way or the other. He had the interest, first of a shareholder in the company, and next of a gas consumer, one of the public. So far as the gentlemen in that room were concerned, having full confidence in the conduct of their establishment, they were tolerably well disposed to adopt the report of their own scientific officers on the point at issue. But then, as gas consumers—as members of the public, who were in that capacity, they had some rights in the matter. He confessed that he had no objection to all that monopolists, whether they were railway companies, or gas companies, or water companies, or corporations, should be controlled by a rational, candid, and well disposed vigilance on the part of the public. But he did not like to see supervision carried farther than that; he did not like to see any unfair or hostile spirit manifested in the exercise of what was the undoubted right of those who purchased the article which a public company sold. Now, the question before them was—how could the public confidence be best established when there was a contest of this kind between the scientific officers of two different bodies? The corporation, no doubt, as the guardians of the public rights, had the duty to discharge of seeing that the public lamps were of the proper illuminating power, and that in respect of these the public were well served; and they were also interested in seeing that the public generally, whom they represented generally, got a fair article for the money they paid. Now he believed that in order to put this matter upon a satisfactory basis, both as regarded the public, the consumers, and the company who sold the article, it was necessary that there should be some independent person appointed, as there was in London (where there were three) to test the gas. Unless there was some person, a man of high scientific attainments in the science of gas—of whom there were more than one in the city—who should be paid partly by the corporation and partly by the company, or otherwise as might be decided, but whose payment should be entirely independent and administered through the Government, and whose office should be held independently of both parties—unless there was such an officer appointed, one whose test and decision would be received with the utmost confidence, confidence on the one hand because of his ability; and on the other because there was no reason why he should not be honest in the exercise of that ability, the matter could not be satisfactorily settled. He did not attribute to the gas company's officer any desire to reduce the real illuminating power of the gas, but the public were not scientific enough to judge between the merits of the two men who made their respective tests, and, therefore, to the end of time this contest would go on, unless there was the *dernier ressort* of some tribunal of the kind he had indicated, from whose decision there need be and could be no appeal. Having said so much on behalf of the public he would add a little more. Both as a consumer of gas and as a shareholder in the company, he wished, as far as his humble abilities went, to judge of the matter himself. He went to the works of the company, and without the slightest hesitation he was afforded every facility for personally inspecting the books. He would of course have naturally placed more reliance on the testors of the company than the testors of the corporation, but he should add that his examination of the books—and he examined closely for weeks—fully bore out the statement in the letter of the secretary, read to the meeting. He might as well tell—as others had not taken the trouble he had—how the tests of the Alliance Gas Company were made. There were ten tests made each day, at the distance of 1000 yards from the works. From these ten tests there was made an average test of the whole. Now, he went through the books carefully for a considerable time back, and in no case did he find the average day's test under 16 candles; it was always something above it, though occasionally very little. But one test of one day—he did not know whether this was the day of the accident—one test of one day showed the illuminating power to be a small decimal under 16 candles; but that test combined with the nine others made up the illuminating power to the full average of 16 candles. And he also found, and this corroborated the statement of the secretary, that there was not any practical difference between the average illuminating power of the gas before the resolution of the committee and after it. He would again say that he hoped the appointment of this official tester of the gas supply would be carried out; if it was not the citizens would be in a state of inextricable confusion, puzzled as they were between two gentlemen both of whom should be assumed to be perfectly competent. In visiting the works he had done what every other shareholder could do for himself. He had always experienced at the works the greatest civility, and every facility was afforded for his inspection. And from his recent visit he could certainly say that they had great reason to congratulate themselves on the state of the works. Their new gas-holder, made to contain 1,300,000 cubic feet of gas, was in a very forward state, and a very beautiful piece of work it was—strong and well made in all its parts. The furnaces were all in admirable condition, and the other portions of the works were in the best state of efficiency. Although he did not claim to possess much scientific knowledge, yet he knew something of such works, and he repeated that the shareholders had very great reason to congratulate themselves on the excellent state of their establishment in all its details. In conclusion, he hoped the meeting would not lose sight of the question of the independent official gas tester for the city. The matter was really most important, and he trusted the agitation raised that day would not be allayed until this officer was appointed. He felt great pleasure in seconding the motion for the adoption of the report and accounts.

The resolution was passed unanimously.

The CHAIRMAN moved—"That a dividend at the rate of 8 per cent. per annum, free of income-tax, be now declared, divisible amongst the several classes of shareholders, such dividends to be payable on and after the 23d of October."

Mr. FOTTRELL seconded the resolution, which was adopted.

Mr. JOHNSON said he had much pleasure in moving that the marked thanks of the meeting be given to the board of directors for the care they bestowed on the affairs of the company during the past six months. The shareholders could fairly congratulate themselves on the fact that the unfortunate dispute with the corporation had, save as to the slight and almost frivolous complaint alluded to by Dr. Waller, been terminated; for that the directors had to be thanked, and they were also entitled to thanks for their admirable management of the dispute arising out of the consumption of coal, by which at one time they were threatened with a heavy loss, but which had now been brought to a favourable termination. He was sure the resolution would meet the unanimous approval of the meeting.

Mr. CLIFFORD seconded the resolution, which was adopted.

Dr. WALLER said, to give effect to the observations he had made, he would beg to move—"That in the opinion of this meeting it is highly expedient an officer, independent of all parties, should be appointed by the Government for the purpose of testing the illuminating power of the gas of this company supplied to the city, pursuant to the precedent adopted in London."

Mr. CLIFFORD suggested that the matter should be left in the hands of the directors, to be reported on by them at the next half-yearly meeting.

Dr. WALLER said it would not be fair to the directors to do that. The directors might be said to be interested parties, and the question should really be dealt with as a shareholders and public question.

The LORD MAYOR said he had abstained as much as possible from taking any part in the controversy between the corporation and the company, and it was simply as a gas consumer he would second the proposition of Dr. Waller, which he believed contained a sound and salutary suggestion for settling an important question.

Mr. TALLON suggested that the resolution should be modified by a statement that the company, while having every confidence in the testing of the gas by their officers, still thought it better to have an independent official testor appointed. The resolution, as it stood, might be interpreted as showing a want of confidence in their officers.

Sir JOHN GRAY, M.P., thought it would be much wiser to leave the resolution untouched. This was a movement suggested on the part of the public, who, as Dr. Waller forcibly pointed out, were interested in the question as well as the company and the corporation, and any resolution passed should go forth as a resolution on behalf of the public, the consumers of gas, and not on behalf of either the company or the corporation.

The LORD MAYOR observed that it was in the capacity of a gas consumer he seconded the motion.

The resolution was passed.

The Lord Mayor having been called to the second chair,

Sir JOHN GRAY said he would take the liberty of moving a vote of thanks to Mr. Denis Moylan, D.L., for his proper and dignified conduct in the chair. The shareholders had so often expressed their sense of the manner in which Mr. Moylan conducted the affairs of the company as its permanent chairman that it was unnecessary to say anything on the subject. He might observe, however, that their chairman was a constant attendant at the board; he was never absent from their weekly meeting; he was never absent when any financial question was to be dealt with, and the successful operations of the company were largely due to the example the chairman set to the other members of the board.

The LORD MAYOR said he was very happy to be in the position of having to submit the resolution to the meeting.

The resolution was carried by acclamation.

Mr. JOSEPH BOYCE, D.L., as a director of the company, begged to move a vote of thanks to their excellent secretary and the officers of the company. They all knew how valuable were the services of the secretary, and the various officers of the company discharged their duties in a way that well deserved the thanks of the meeting.

Mr. MILO BURKE, J.P., seconded the resolution, which was passed.

Mr. STEVENSON said he need scarcely observe that he felt extremely grateful for the compliment just paid him. It was with great pleasure he was able to state that knowing the way the important and onerous duties of the company in its various branches were conducted, he believed every one of their officers was well entitled to the vote of thanks which, on their behalf, he had to acknowledge.

The proceedings then terminated.

In consequence of the remarks of Dr. Waller at the meeting of the company, held on the 30th ult., Mr. Byrne, chairman of the Corporation Gas Committee, has addressed the following letter to all the Dublin papers :—

THE CITY GAS SUPPLY.

Sir,—Were it not that the statements made by Dr. Waller at the meeting of the Alliance Gas Company are calculated to mislead the public, I should not trespass on your valuable space.

Dr. Waller is reported to have said that in London there are three independent persons appointed to test the gas, and he evidently meant to infer these officers were appointed by the Government. The person or persons from whom he derives his information has evidently either wilfully or through ignorance misled him. In the City of London the gas examiners, whose duty it is to test the gas daily, are in every instance appointed and salaried by the corporation, under the provisions of the City of London Gas Act., 31 & 32 Vict., cap. 125, and in the districts outside the City the appointments are made

either by the Metropolitan or vestry boards, who also pay the salaries, and there is not a single instance in the United Kingdom where a gas examiner, whose duty it is to test the gas daily, has received his appointment or salary from the Government. Under the City of London Gas Act three referees were appointed by the Board of Trade, but not for the purpose of testing daily the illuminating power of the gas, their duty being to certify instruments, make experiments, and fix a standard for sulphur, and to decide on and certify the burner to be used in testing the gas by the gas examiners of the London Corporation. They did certify a burner which is now known as the referees burner, and which the citizens of Dublin have every reason to remember, inasmuch as it is similar to the one which the Alliance Gas Company, by their bill of last session, attempted to impose upon the Dublin Corporation as a test for the gas supplied to the city, whereby the company would have been enabled to dispose of, as 16-candle gas, an article similar in quality to that which was supplied to the citizens under a standard of 12 candles, previous to the arrangement coming into operation for the increase in illuminating power from 12 to 16 candles. Under the same statute a chief gas examiner was appointed, his duty being to receive daily the reports or results of the tests made the night previous by the officer appointed by the local authorities; and in the event of a dispute arising between a corporation gas examiner and a gas company he is to decide between the disputants on that which, in nine cases out of ten, he has not seen. The salary of this officer and the three referees is paid by the four gas companies within their jurisdiction, and their salaries and other expenses combined have amounted to something like £8000 up to the 1st of January last, for a period of about two years, as shown by the London returns which are now printed. The public will appreciate at its true value the anxiety displayed by the company for the appointment of a gas examiner, when they are made aware of the fact that amongst the most prominent witnesses put forward by the company in opposition to the citizens and the corporation during the proceedings before the select committee in the House of Commons last session, were one of the referees and the chief gas examiner referred to above. Under the existing circumstances the Alliance Gas Company, if they feel themselves aggrieved at the reports of the corporation gas examiner, are in precisely the same position as all other companies in the kingdom (save four out of the thirteen London companies), viz., to go before a divisional or police magistrate, who, it must be assumed, is an independent officer, to have the case adjudicated upon by him after hearing evidence upon oath on both sides. If Dr. Waller is anxious to render the shareholders and the gas consumers a service, he will insist on the appointment of a public auditor to audit the company's accounts, not merely for the past year, but since the amalgamation, and he has a precedent for this, as in London. There is an officer in that capacity in that city appointed under the City of London Gas Act, and such an arrangement controls expenditure in such a way as would shortly in Dublin not only increase the shareholders dividend, but lower the price of gas to the consumers, who have a direct interest in the economy of the company's expenditure, secured under the General Gas Act.—I am, sir, your obedient servant,

Lombard Street, Oct. 3, 1871. JOHN BYRNE.

BIRMINGHAM GAS COMPANY.

The 104th Half-Yearly Meeting of the Birmingham Gas Light and Coke Company was held at the Offices of the Company, in Union Street, on Wednesday, Sept. 27—Mr. MORRIS BANKS (the chairman) presiding.

At the commencement of the meeting it was put to the shareholders whether or not the reporters should be admitted, and this was decided in the affirmative.

The report of the directors and the statement of accounts, which appeared in the last number of this JOURNAL, were taken as read.

The CHAIRMAN moved—"That the report and balance-sheet be approved and adopted." He said: The half year's accounts now read contain a true and faithful record of the financial condition of the company. The report states the past transactions, the present position, and future prospects. It is so full of detail, and, doubtless, has been carefully read by you individually, that I will not occupy your time by recapitulating or commenting upon it. Your directors are most willing and desirous of affording you the fullest information or explanation relative to any item either in the balance-sheet or report, but whatever questions are asked, or comments made, may I hope that personality will be avoided as much as possible. When such occurs, recrimination ensues, and it is doubtful if it would lead to any good result. I need hardly say that the conduct of your late secretary and some of your collectors has been to us a source of great anxiety, pain, and labour. In all large concerns the continuous employment of very old servants, occupying important positions of trust, naturally induces confidence, and we deeply regret that it has been misplaced in our case in an aggravated form. The entire establishment has undergone and is undergoing a searching and thorough investigation, and although we were temporarily deprived of so large a portion of important officials, we have now obtained, we trust, a faithful and more efficient staff. Although the cost of gas in Birmingham, with very few special exceptions, has been lower than any other town, consumers have the advantage of another recent reduction in price. The board have the fullest confidence that, by an improved system of accounts, providing increased checks against fraud, with economy and zeal in every department, they will be enabled to place the company on a more prosperous and firmer basis. It is a source of much satisfaction that, although the amount of defalcation is large, the reserve-fund is adequate to cover the loss, and the balance in the profit and loss account is sufficient to pay the usual maximum dividend. I beg to express my personal appreciation of the valuable services rendered, during our late perplexing difficulties, by your new secretary, Mr. Slocombe. I gladly testify to his untiring energy and high business qualifications. The thanks of the shareholders are also especially due to Mr. Edward Bembridge and Mr. George Beech for their assiduity and extreme care in auditing the balance-sheet.

Mr. J. T. COLLINS seconded the resolution.

Mr. D. MALINS said the report was, on the whole, exceedingly unsatisfactory to him, and offered no sort of reparation for the difficulties with which the company were surrounded.

Mr. T. BULLOCK, jun., said, in moving an amendment, and in making the few remarks he had to offer, he should be careful to utter nothing which would be personal, rude, or ungentlemanly. He felt most strongly about that report. It was not what the shareholders deserved, or what, in the position of the company, should be put forward. He thought it was as bad a report as he had ever seen. It did not explain those difficulties that they wanted explained, and it shelved the consideration of matters which were most important to the shareholders. Coming to the separate clauses, the 4th was respecting the keeping of the accounts. "The system of keeping the company's accounts was devised by one of our number who has been repeatedly honoured by your confidence, as shown by continuous re-election. It has been from time to time, up to the last half-yearly meeting, approved of by auditors elected by you; but unfortunately it has not, as the event has proved, been found effectual against a combination between your secretary and at least one of your collectors systematically to falsify the accounts." He did not know what the shareholders knew of their system of keeping accounts. He should think they knew nothing. He did not suppose that any gentleman who was in the habit of attending those meetings had the slightest knowledge of their manner of book-keeping. He should mention one thing, which was that they did not keep a cash-book. Why, such a system would not be allowed in the smallest manufactory. The directors said that the confidence reposed in that system was not confined to them and their non-professional auditors, for in 1868 they employed Messrs. Roberts, Malins, and Coleman, who audited the accounts; and the directors published a paragraph of the report. But they gave that in a garbled manner; they gave one portion and not another, and it was the second portion of the paragraph which was important. The first one said simply nothing. What the system of check meant he did not know. From what they saw afterwards from a letter which appeared in the newspapers, the report presented a very different view from that which the directors made out. The paragraph of the report which was omitted was—"We do not profess to have scrutinized all the details of the company's affairs, as such an investigation could not have been made within the time allowed. Judging, however, from the fact that all the books and papers we have examined bear the signature of your chairman, we presume that a careful investigation has already been made by him." Well, now, that was the auditors report and examination of the accounts, which meant that certain papers were handed to them bearing the chairman's signature, and that they knew nothing else about it. He thought the directors would have behaved very much better if they had handed them everything in reference to the accounts. The next paragraph was in reference to the investigation in September, 1870. Why there was no audit in 1869 or earlier in 1870, he did not know. In September, Mr. Beech was called in. Mr. Beech was a friend of his, and was a gentleman holding a very high position. As he (Mr. Bullock) was informed, Mr. Beech applied for the cash-book, and said he could not make the audit without it. He was told they had no cash-book, and that he must pass the accounts as they were sent to him. That was all that was done, as the time was so short. On the next paragraph, which was in reference to the defalcations of the collector, Blundell, and as to the manner in which he had been treated, he had no remarks to make. The next paragraph, which was on the second page, was important. "With respect to the collectors other than Blundell, although their conduct in not disclosing to us, if not conniving at, the irregularities of which they were aware, was most reprehensible, we were advised by your solicitors, and also by counsel, that no criminal proceedings could be sustained. We, therefore, obtained as much money compensation from them or their sureties as we could get, and, as such payments were made to prevent exposure, we cannot, as in the other cases, publish the names of such collectors." He would be bound to say that no gentleman ever read a paragraph like that before. They had received money from these sureties, and from the collectors themselves, in order to keep matters quiet. This from a company with a capital of £300,000. He should ask for the names of those collectors, for an explanation of those transactions, and for what they had to say in reply. He was sure that, if they were to get to the bottom of the affair, they must go to the collectors. There had been some diffidence, he believed, in prosecuting these men, and the reason was plain. If one of those men were put into the dock he might put such questions into counsel's mouth as would make the directors feel that they had neglected their duty. He was told that Mr. Harrison's solicitor was prepared to produce him at a short notice on certain conditions. Plenty of men knew where he was. He said, without fear of contradiction, that they had not searched for Harrison or Blundell until they knew perfectly well they were out of the road. It was true that the directors offered a reward of £100, but they knew at the time that the men were gone. He believed if the directors ever did a good day's work, it was in the appointment of Mr. Slocombe, which was the subject of the next paragraph. The next paragraph had reference to the loss they had sustained. Then they came to the resignation of Mr. John Chesshire. Three or four years ago, knowing the career and expenditure of Mr. Harrison, the speaker advised many of his friends who had shares in that company to sell them. He was informed by one or two of them that, so long as Mr. Chesshire was chairman, they would never sell their shares, for they looked upon Mr. Chesshire as a good business man, straightforward, honest, and honourable. Somehow or other, he resigned, and his resignation at that critical time required some explanation. He cordially concurred in the appointment of Mr. Edwin Yates. He should say nothing about the chairman or the deputy-chairman; and then they came to the proposed appointment of Mr. Bembridge and Mr. Watson. Mr. Bembridge was, no doubt, an excellent man. He did not know him, but he should say that an auditor who passed such accounts was not particularly fit to be a director. He thought there should be a little more business qualification in a director than Mr. Bembridge had shown, in not asking for the cash-book. Then came the recommendation as to the dividend. The capital of that company was £374,076. The capital of the Staffordshire Company was £557,000. Any comparison between the two companies was perfectly fair. They worked in the same town, and on the same ground. He knew they went out of the town, but their profits on that business could not be equal to the town business. The Staffordshire Company's capital was half as large again as theirs. The profits of their company were £13,000, those of the Staffordshire Company £25,000 in rough figures.

Mr. LUCAS: No. There is a heavy balance brought forward. The profits are not equal to the amount of the dividend.

Mr. BULLOCK said he had nothing to do with that. The balance-sheet was there, and showed that the amount available for dividend was £25,310 17s. 3d. It was distinctly written. It certainly appeared on the opposite side that £29,000 was brought forward. (A VOICE: "They have paid for a new gasholder.") Their whole amount paid for repairs and maintenance of meters, mains, service-pipes, and other works, was £17,800. That was a very different thing to what they had done. Their item of expenditure in the report for repairs, &c., was only £3646. The Birmingham Gas Company had added to their capital this year a larger sum than the Staffordshire Company—viz., £4770, or £617 more than that of the Staffordshire Company; and the latter had been able to charge £17,000 to the debit of their working. They could pay a dividend. They had earned it, at all events. They could charge £17,000 from the working expenses of the last six months to the credit of the shareholders. More than that, they could charge that sum *plus* £14,000. The balance-sheet he should leave with other remarks he had to make, and he would come to the questions he was going to ask the directors. He asked for the names of the collectors, the amounts deficient and recovered. He asked what had been the total cost of the board of directors for the last three years; and he should like included any extraordinary expenses that had come into the office work; he should like to know how much extra had been paid in consequence of the extra attention that was to be given by certain members of the board, in reply to remarks made by shareholders two or three years ago, and to a petition from the shareholders to the directors. He asked if the share register had been carefully gone through, also the loan account; who estimated the value of the plant, and other items of credit in the present balance-sheet. The plant represented an enormous sum. A great deal of it was buried under the roads, and a few thousand pounds might easily get in by mistake. He should move the following amendment:—

"That the 104th half-yearly report and statement of accounts of the Birmingham Gas-light and Coke Company, as now presented to the shareholders by the directors, is unsatisfactory, and be not approved, and that a committee of inquiry be appointed to investigate the accounts and all other details of the general working of the company, the said committee to have power to examine all officers, clerks, and servants of the company, and that they shall have free access to all books, papers, and documents, of every kind and nature whatsoever, the property of the company, and that this meeting stands adjourned until the committee of inquiry is ready to present its report to the shareholders."

He thought he was not asking too much when he hoped that several of their present directors would resign. He thought it very important that the company should have the confidence of the public, and to get this he was sure that several of their present directors must resign. It had been too much the custom of shareholders to attend meetings, and, so long as the directors gave them a dividend, to rest satisfied; but when a deep system of falsifying the accounts came to view, and when they found a great company like that without a cash-book, matters were different. He did not think a parallel case could be found anywhere. As he had said, even the smallest manufacturer had a cash-book. The difficulties had been so great in elucidating matters, that the company could not tell upon which officers the defalcations should be charged. Though professedly separate accounts were kept, the accounts were so mixed up that they dared not give any one in charge for embezzlement in consequence of the difficulty of proving it. If the directors lost the confidence of the shareholders, they would lose the confidence of the public. If they were to get their dividend, they must have directors who had the confidence both of the company and of the public. The shareholders had something to do with the profits of the company, but the public had to do with the burning of gas, and without that they could not carry on. That was the great reason why a large proportion of the old directors should resign. One or two of the old directors were to be submitted to the meeting for reappointment. He thought it would have been better if all names had been left out, and the matter had been put entirely

in the hands of the meeting. It was a very awkward position to stand up in that meeting and say, "I object to Mr. Bembridge, and I object to Mr. Watson." Mr. Bembridge had certainly shown that he was not entitled, without explanation, to ask for their votes, as he had signed a balance-sheet which turned out to be utterly wrong in every particular. Another thing was customary in a company like that. They depended very much upon their engineer. Mr. Slocombe was, no doubt, a very good secretary; in fact, he knew that he was a very excellent officer; but he could read their engineer's map about as easily as he could decipher the inscription on an Egyptian pyramid. He did not know their engineer. He did not even know his name. They had had no report from him. They ought to have had one, stating the condition of the works, and signed by him.

Mr. YATES: The report is on the table.

Mr. BULLOCK: It is not printed.

The CHAIRMAN: That is not customary.

Mr. BULLOCK said he thought this company was one of the most favoured companies which could possibly exist. The manufacture of gas was not very difficult, and they had nothing to do in the office but to keep the accounts. Gas was an article of necessity—it never went out of fashion; the public must have it; it delivered itself, it was no trouble whatever; and he thought the whole time of the board should have been devoted to the accounts. It was not like many manufactures; it needed no canvassers to dispose of it. But what had the board done? What they should have done many of them had never touched at all, and those who had, either from ignorance or from some other cause, altogether misled them. That company was the earliest in the market, and had many advantages, but, despite them, the Staffordshire Company had stretched their mains and extended their ramifications for miles around. They had done this when gas was dear. They put down an enormous number of mains, paid for out of working expenses for the most part, with the view of bringing future profits. If they could pay their dividend now, they would be far better able to do so when their mains became more useful to them, through the increase of their business which took place day by day. They had been extending their trade in every direction, while the Birmingham Company had remained quiescent, believing that "sufficient unto the day is the evil thereof." One word more with reference to a very important matter, and that was as to the directors not finding out the defalcations earlier. It was a well-known fact that Mr. Harrison was spending five times his income. They knew that he kept a costly establishment. Some of the directors knew it, because they were in the habit of dining there. His table was covered with the most *recherché* viands and the most expensive wines that money could buy. It was the common talk of the town that on no nobleman's table was money more lavishly expended. He kept two or three hunters, and his sons hunted with him, and they were mounted several days in the week. He had a shooting manor, and he (Mr. Bullock) was well informed that one of the directors rented the manor with him. His gardens were a perfect luxury, and he had been informed that the gas-fittings in the summer arbours had just been valued at £160. The great startling report of the defalcations of Mr. Higgs in London a few years ago should have taught the directors a lesson. At all events, they might have seen what Mr. Harrison was doing. Instead of that, he took a six weeks holiday at Buxton, for an attack of gout, brought on, no doubt, by reason of his good table; and, instead of coming back, sent his keys, gave a power of attorney, and would return, probably, when the matter had blown over, if he were not prosecuted. When he spoke of gentlemen dining at Mr. Harrison's table, he did not know the names of the directors. He did not speak personally, and it was not his intention to have offended any one. He hoped he had not done so; but he held that the wisest thing to do, under the circumstances, was to appoint this committee of inquiry. If the balance-sheet were found correct, it would be a guarantee of it. If they did not appoint the committee, and in two or three years a similar thing occurred, the whole world would turn round and say it served them right. Unless they started well, unless they wiped out the old stain, they had no chance of success in the future.

Mr. DAVENPORT seconded the amendment.

Mr. SMITH, of Solihull, said the position he occupied was that of trustee, and he therefore thought he was entitled to look upon the balance-sheet from another point of view to those who look upon it simply as investors. He might mention that he and those on whose behalf he appeared held £4000 to £5000 worth of shares. His remarks, however, would certainly not be of a personal character. They would relate more particularly to the accounts which had been presented to them. He wished to call special attention to one item in the balance-sheet, and that was the amount which was owing to the company, and that item alone represented £49,000 odd, for gas, coke, residuum, &c. He could not help thinking that much of that might have been collected. It seemed to be a very large amount to be owing. Certainly, since the 30th of June, it might have been reduced, but it was a very large amount for a company whose whole capital was only £300,000. He called special attention to the example of the Staffordshire Company, whose capital was double that of the Birmingham Company. Although the debts of the Staffordshire Company were too large, they only amounted, he thought, to £69,000, with a capital of £670,000. He could not help thinking that this was a matter which should be commented upon. Had the arrears of the gas company not been so large, he thought that the defalcations of Harrison and the collectors could not have happened. He should not pledge himself to vote for the resolution or the amendment, but he should listen to the explanation which would, no doubt, be given by the board, and he hoped to hear that the amount of outstanding debts would be reduced in future.

Mr. E. YATES said, with reference to the statements of the last speaker, the amount of £40,000 was owing on the 30th of June, when the accounts were only made out, and, of course, had not been collected.

Mr. SMITH said he saw how much was earned annually; and, therefore, he could easily reckon how much was arrears.

Mr. J. C. WYNN said it would be remembered that three or four years ago he warned the company that there was something wrong—some hole through which the profits of the company were drifting. The directors had been in the habit of meeting with Mr. Harrison for 20 years, and they thought he was a straightforward, honest, honourable man. Time after time he stated circumstances similar to those which Mr. Bullock had mentioned, but not so plainly—as the facts had not then come to light—which cleared up things which were then obscure. Still so much confidence did the directors place in Mr. Harrison, and so greatly was that confidence shared by the shareholders that upon his honour he seldom got anything but discouragement when he brought the matter before them. If the shareholders sanctioned the confidence which the directors felt in Mr. Harrison they shared the blame. He agreed with the statement that the directors were open to censure for allowing these accounts to get into the state they were, and in not discovering these defalcations long ago. He dissented also from the way in which they had acted since the discovery. He thought it would have been better had they called a meeting of the shareholders and prepared them for this annual meeting. They were there to-day not prepared to take any course. He should think that a sub-committee should be formed to take into consideration the present condition of the company, and to report to another meeting, but he did not know how that could be done at the present time, because many individuals were dependent upon their interest coming to them, and which would only be due after these resolutions were passed. Consequently, he did not know how they could dissolve that meeting or adjourn it without inflicting injury upon certain parties. He thought that the questions which Mr. Bullock had asked might be referred to the sub-committee to be appointed. He did not see how the directors at the present moment were prepared to answer the questions. If the sub-committee thought that the whole of the questions were necessary, it would be well to leave them in their hands. He had only to ask the meeting to meet the difficulties with as much quietness and prudence as possible. There was nothing to fear. The company could, if properly managed, meet the difficulties they laboured under. The Staffordshire Company laboured under serious difficulties, having long mains which were not valuable to them at present. Ultimately, no doubt, they might get their reward. He saw no reason why they should not keep their present plant in such a condition as to enable them to compete with the Staffordshire Company in any manner.

Mr. BROOKES thought that every confidence was felt in the matter being fully investigated.

Mr. BATEMAN asked whether it was possible in any way to separate the proposed committee of inquiry from the declaration of the usual maximum dividend. Their loss had certainly been about £26,000, but they had a reserve-fund of £27,000 existing, and they had earned enough to pay their annual dividend. It was a most unfortunate affair, but it was no use crying over "spilt milk." He agreed to a committee of inquiry being appointed, but he should support the directors in every way.

Mr. LUCAS said that the present was the time when he should endeavour to justify himself, and when he should refer to the condition of the company during the 40 years in which he had known it. It was said that the system of keeping the company's accounts was advised by one of their number. That did not express the whole truth. The system was originated by Mr. Thomas Pemberton, grandfather of the present Mr. Pemberton; for, during the 25 years of the company's progress before the speaker became chairman, the business was carried on under the superintendence of Mr. Alexander Smith, the engineer, and, to a great extent, the manager. The system which was carried on included the checking of the sales by double-entry. Every item of account which was made up was debited to a collector, and he was credited with what he had paid in during the quarter, with the discounts he had to allow, and with the bad debts which were struck off every six months. There was a complete system of double-entry with respect to their incomes. He found their outgoings, their expenses, in a very loose condition. Though he did not supersede the system of accounts, he supplemented it with all those checks and balances which were referred to by the auditors in 1867. The want of a cash-book had been much commented upon. The system adopted by Mr. Smith, in conjunction with the first chairman, was to make the bank-book a complete epitome of all transactions, debtor and creditor. Everything was to be paid into the bank as income, and nothing was to be paid out unless by cheque. That was the system carried on up to the time of the defalcations, and during the whole 25 years before he was chairman it was never objected to. He took it as he found it, and improved upon it by "that elaborate system of checking" which had been referred to. He endeavoured that in their outgoings everything should be checked as closely as possible. Professional auditors were called in in July, 1867. There was nearly three months for them to go over the accounts in. They alleged that every opportunity was afforded them, that everything was laid before them properly, that they had every assistance from the chairman and the secretary, and that they were much pleased with "the elaborate system of checking." They apologized for not going further into the accounts by saying, in the portion of the report they were blamed for not publishing, "We do not profess to have scrutinized all the details of the company's affairs, as such an investigation could not have been made within the time allowed." That was a matter of opinion. The paragraph went on: "Judging, however, from the fact that all the books and papers we have examined bear the signature of your chairman, we presume that a careful investigation has already been made by him." Had the auditors gone into the accounts of the outgoings, which the examination very naturally supposed would have been done, they would have discovered these defalcations, because it was now ascertained that they commenced before that time. They supposed that because he had examined one portion of the accounts that he had examined them all. They said that they had not time properly to investigate matters. They were called in to examine a six-months statement of accounts. They had access to every book, to all the accounts, and they went back for 12 or 14 years in reference to some accounts, which was a matter of curiosity. It would have been far more profitable had they done what they were called in to do. In 1867 the speaker retired from the chair. There was an alteration made in the constitution of the management of the company by the directors. He became a member of the rotary committee, of which there were two, one for the works and the other for the accounts. He took his month with the others, and they made a sort of examination. They did a great deal of work, but still, unfortunately, they did not go into that which they had better have gone into—the outgoings of the company. Mr. Harrison's defalcations came upon him like a thunderbolt. He had the greatest confidence in him. He had known him for 37 years. He had watched him a boy there, and he had never seen anything in his conduct to have caused the slightest suspicion. He never was but once in his house, and that was 25 years ago, when Mr. Harrison was ill. He never heard a single rumour or a breath of suspicion which attached to him. Mr. Chesshire, on his resignation, expressed the greatest confidence in him, and acknowledged the assistance he had received from him. Unless a man were to be blamed and held up to public execration if he did not suspect every man about him to be a rogue until he had proved him honest, he did not see in what way he could be blamed for not suspecting Mr. Harrison. Had he had the slightest ground to do so he would have instantly denounced him, as he would have done any other servant of the company who was found to be doing wrong. Whether they would convict him of anything more than of placing too implicit confidence in a man, he could not tell. He left that with them. The speaker then referred to the cases of Mr. Lumley, who was convicted of frauds on the Staffordshire company, and Mr. Higgs, who defrauded a London company. In both cases the men were living very extravagantly, and no notice was taken of it. In the case of Higgs, the present Lord Mayor of London was chairman of the company at the time of the defalcations, yet he had never heard the slightest imputation against that gentleman's character, and it had not prevented him from rising to the highest office in the City. During the 40 years the speaker had been engaged as chairman, director, or committee-man, he had been repeatedly thanked for his services, and he had a final testimony from his colleagues as to the value of those services on his recent retirement as a director.

Mr. BULLOCK: I should like to know who was present at that meeting, and whether the new directors were there.

Mr. BOUGHTON: I was not; but I should not have objected to it if I had been there.

Mr. LUCAS said the constitution of the company was altered in 1865, when the last new Act of Parliament was obtained. Since that time he had been five times elected as a director. Previously he had been twelve times elected as chairman at the annual meeting, he had been elected twelve times as chairman by the directors, and he had no doubt that he might have been re-elected on his retirement had he chosen. He had been five times elected director by the annual meeting. Some time back he had become tired of the work. It had been the work of a lifetime with him. He had devoted his life to it, and he had left his stamp upon the company. This seemed like self-glorification; but he challenged his colleagues to deny that the Act of Parliament was got by him. He increased their capital to £99,200, and he devised the means of justifying that by consultation and counsel's opinion, in conjunction with Mr. Thomas Collins. He should leave them with regret, and he hoped that they would do him the justice to say that he had been their faithful servant so

far as his humble abilities went. There had been something said about an extra allowance being paid to certain directors for extra work. By a resolution passed, they would find that £200 was voted to the chairman, and £400 to be divided amongst the other directors, according to their opinion of the duties required, and the extra service performed. In September, 1864, in consequence of its being clearly shown that there was a wide difference between the amounts paid here and in London, the amount was increased to a total of £1350, and it was resolved that some provision for extra services should be made. As he stood there before God, speaking solemnly, he had never taken a single pound which he had not earned amply, doubly, trebly, and with that he had left them.

Mr. BEMBRIDGE said he was sorry that Mr. Lucas had gone so far into the matter. Bygones were bygones. He desired to make a few remarks on the question of the committee of inquiry, and to ask whether the appointment of such a committee was thought necessary. He was appointed auditor 12 months ago. He was not present at the time, or he did not think he should have undertaken the work. Finding the appointment was made, he thought he would try it for 12 months. [At the request of the speaker, the auditors report was read—a lengthy document, in which the auditors thought it desirable to make a few remarks upon the absence of a cash-book and other books, and in which they recommended that proper books should be kept in future. They also recommended that the loose sheets furnished for their inspection should be bound and kept. Reference was also made to the large amount of arrears.] He did not for a moment wish to impute motives; but he thought the whole facts of the case should be before the meeting. When he and his colleagues went into the audit, they had a balance-sheet before them. They went to the capital account, and they found £87,000 owing to the company. They said, "We must go through the ledger, and see that this is really owing." Mr. Harrison said, "That is quite unusual," and referred to Mr. Lucas, who was present. Mr. Lucas said it was quite unusual. The speaker said, "I do not understand an audit unless I can say to the proprietors whose auditor I am—for I stand between them and the directors—'this is all correct.'" They were told emphatically it was no business of theirs. They appealed to Mr. Lucas in the presence of Mr. Harrison, and he said it was not their duty. The speaker said, "How are we to know if these debts are good?" Mr. Lucas said, "You must come on the board." The speaker replied, "That is no use. You do not know it; the directors do not know it." He wished that Mr. Lucas had gone entirely into this matter. He gave him credit for everything he claimed; but he could not help thinking that he was on the horns of a dilemma. He had said at the time he should not pass those accounts; but there was only a fortnight allowed for the audit, and that was not sufficient time for the work; and that was the reason why, in their report, they recommended a continuous audit. They resolved to go through these accounts, and they did go through them. They said they must see the ledgers, and Mr. Harrison offered them check-sheets, which would have been valuable to save time, had they been copies of the ledger made by an honest man. They refused the check-sheets, and determined to go through the ledgers. At that time they were just making new ledgers, and the work was something terrible. They had 18 old ledgers to follow, and they saw sufficient to make the report upon which the directors had since acted. The question was—Did they think it necessary to appoint this committee of inquiry? There had been a thorough investigation of the accounts, and it was found that those check-sheets were not correct. In speaking to Mr. Lucas, in the presence of Mr. Harrison, he pointed to the check-sheet of a district, and said, "You will find that the Curzon Hall account has been paid four years ago, and Mr. Harrison has received the money and the company has not." Mr. Lucas had made the remark that when Roberts, Malins, and Coleman were called in, they had all the books placed before them which they asked for. That was their position at the last audit. They did not know which books to ask for. Had a small ledger been put into their hands, they would have discovered the defalcations in five minutes. The books had not been posted for months and years. The fact was that a vast amount of work had been done by Mr. Lucas. They knew his correctness and integrity; but he made out balance-sheets, and the figures were really Mr. Harrison's. Mr. Lucas had such confidence in Mr. Harrison that he never verified the figures. That was the difficulty which was now removed. In order to make balance-sheets, Mr. Lucas had spent days and days in the office; but every figure for all practical purposes was supplied by Mr. Harrison, and not by Mr. Lucas. That would not do for them in the future. It would be impossible, in fact, if the inspector was there, and there was a continuous audit by a professional accountant. He asked them whether, under such circumstances, they thought it necessary to appoint this committee, or whether they would not wait till the next half year. That committee would be expensive, and no better system could be devised to prevent errors, or to call in arrears, than that they had in operation. No figures would in future be taken on faith. He did not think it was a professional accountant's duty to test the accuracy of the debts, for if the committee was of any use they ought to present the list to the accountant, and say, "We know these to be right." He did not think it was possible, under present circumstances, for any such irregularity ever to arise again. The concern was in a healthy state, and in six months it would be perfect, he believed. Looking at the trouble and disadvantage that might arise, he asked them if they were of opinion that such a committee was necessary.

Mr. COLLINS (deputy-chairman) said it was about three years ago that he joined the board, about the time of the presentation of the report by Messrs. Roberts, Malins, and Coleman. To him it appeared that all through there had been one great mistake. Every one thought Joseph Harrison to be a thoroughly honest man. The secretary was not, however, absent six weeks on a holiday; it was about three days.

Mr. BULLOCK: He had been away previously.

Mr. COLLINS: He had been away previously for a few days; that was all.

Mr. BULLOCK: I am speaking from the time of his first holiday to the time the reward was offered.

Mr. COLLINS said, with reference to the offer of the reward, that was done so soon as it was advised by their solicitor. They acted under his advice, and they were anxious to do all they could at the earliest possible moment. That the secretary escaped was a matter entirely beyond their control. He was very much surprised to hear that there was communication with him, and that he could be produced at a very short notice, for he learnt from one of their solicitors that it would take a fortnight to communicate with him.

Mr. BULLOCK: That is only one statement against mine.

Mr. COLLINS said he thought they might depend on their solicitor's statement. He had heard more about Mr. Harrison's mode of living since he went away than ever he had done before. He had thought that Mr. Harrison lived a quiet country life, and perhaps kept a horse or two on his farm. The shooting-manor was spoken of at that board, and a gentleman said he joined Mr. Harrison in the manor, and that he paid £5 for it. He himself, at the time, felt great confidence in Mr. Harrison, and the opinion of the directors, of the professional auditors, and of everybody confirmed him in that confidence. Had any suspicion arisen in his mind, there were many circumstances which would have removed it. He had long been in favour of professional auditors, but he thought there was no absolute necessity for insisting upon it in that company, or of retiring. He had also thought that a continuous audit was the only satisfactory manner of really certifying the accounts of the company. He must say he did not suspect Mr. Harrison. He had long been in the habit of treating people as honest until he had found them to be dishonest, and there was nothing to give him suspicion in the case of Mr. Harrison. He had every confidence in the figures of the report, and in the well-working of the company. He had given himself considerable trouble to compare their company with the Staffordshire Company, and he found there was a great similarity of proportion running through them. So far as he was personally concerned, he had no objection to the appointment of the committee, for he believed that the more thoroughly the matter was investigated, the better it would be.

Mr. D. MALINS anticipated a legal difficulty in reference to the amendment. He agreed substantially with it, and the appointment of the committee would, no doubt, become a fact, for he, for one, was so dissatisfied with the report that nothing but a complete investigation, under the control of the shareholders, would remove the dissatisfaction. That meeting, however, was called for a special purpose specified by the Act of Parliament, and no notice had been given of the intention to move the amendment. He should like to know whether the directors would acquiesce in the appointment of the committee, and would call an extraordinary meeting for the purpose of consultation primarily, and of effecting a complete investigation of the prospects of the concern. He hailed with satisfaction the presence of the reporters, for it was an exceptional period, and he thought that they ought to give the fullest information to the public consistent with their interests, and that they ought to have the fullest information themselves. Let them put the matter on a good basis, for he feared some disastrous results.

The CHAIRMAN said, on the part of the board, he promised most gladly to acquiesce in the appointment. They readily accepted it, for they had nothing to conceal. The gentleman who moved the amendment laboured under a great misapprehension of facts. The directors had a good reply to a great number of the observations, and he would be glad if the shareholders would kindly allow the business to go on, simply understanding that, if it was the wish of that meeting that a committee of inquiry should be appointed, the directors had not the slightest objection. He fancied that he should like to divest his mind of any interest in the concern; and, looking upon the matter as an outsider, he must say that if counsel had been employed to lower the old gas company in the estimation of the public, the duty could not have been performed more ably than by Mr. Bullock. He had had the stoutest feeling of loyalty towards this company. The committee of inquiry would find that the directors had had the interests of the company at heart. The present directors held nearly £40,000 worth of shares in the concern. A remark was made touching the resignation of the late chairman. It was stated that he had resigned his chairmanship and also his directorship, and it was implied that he knew of something wrong that induced him to leave the concern.

Mr. BULLOCK: I never said anything of the kind. I said his resignation, coming at a time like that, required some explanation.

The CHAIRMAN: Your remarks left that impression upon my mind.

Mr. BULLOCK: If you like to infer that I thought it, you can do so. I did not say so. Mr. Chesshire is a friend of mine, but his resignation, after so short a time, is one of those things which are generally explained in reports.

The CHAIRMAN: On his resignation he paid a very high compliment to the late secretary.

Mr. WYNN said that it was perfectly legal to approve the statement of accounts only. He had perfect confidence in the examination of Mr. Beech and Mr. Bembridge, and he did not think that any further examination by any committee was necessary. Still, there were other matters in which the assistance of a committee would be invaluable; for instance, in giving that confidence to the directors which they ought to have if they held their places. He believed it was perfectly legal to approve the accounts and pass the resolution giving the dividend, appointing a committee, and adjourning that meeting. He was no antagonist to the directors, but he wished to say that if that company was to prosper a complete examination must be made into everything which had to come out. Everything must be laid before the shareholders, so that they might know all that there was to be known. There was no doubt there was an idea abroad that such a system of fraud could not have been carried on for so long without some gross negligence. As he had said, he had perfect confidence in the general board of directors, and he should be ashamed of himself as a Birmingham man if he would not, knowing them as he did, vouch for their integrity; and he could only suppose there was something they did not know of which would be satisfactorily explained to the committee. Great loss had been sustained, but, if it were legal, he thought the way he had proposed would be the best.

Mr. JOHNSON, the solicitor, said it would be very inconvenient for the meeting to separate without declaring the dividend and re-electing the directors. It was legal to pass the report and the accounts, and to declare the dividend, or to pass the accounts and not the report. To that might be joined the appointment of a committee of inquiry, if there was nobody to oppose it. The committee would have every facility it was possible to give. Mr. Malins was right when he said that, strictly speaking, a committee could not be appointed at that meeting, because afterwards the directors might refuse to allow them to have information before them. However, by the willingness of the directors to agree to the plan, it was competent for them to pass the amendment of Mr. Bullock, or to pass the accounts and leave the report. He thought he could clear up very satisfactorily the matters which Mr. Bullock had mentioned. He had said that Mr. Harrision was not far off, and that his solicitor was prepared to produce him on certain conditions. That was one of those half truths which were often more incorrect than absolute falsehoods. The condition mentioned on which Mr. Harrison would be produced was that the company should abandon all criminal proceedings, either express or implied, by proving their debt under the bankruptcy. Whether the whole of Joseph Harrison's property went away from the country or not, he had it laid down as the leading principle of his instructions, that they would do nothing which would prevent them from putting him into the dock the moment he came into the country; and in regard to every one of the officers who had been guilty of fraud, his imperative instructions had been that criminal prosecutions should be instituted against them; and if such criminal prosecutions had not been instituted in any case, it had been because they had no ground on which to act. He wished that the matter should go clearly forth to the public, that every proceeding which could be taken had been taken. They had preserved, and should continue to preserve, their remedy, and there was no doubt that if Mr. Harrison set foot in this country he would stand in the dock as a felon.

Mr. BOUGHTON said, in reference to Mr. Bullock's statement, that the Birmingham Company had not extended their business—that it must be remembered their Act did not allow them to go beyond the borough.

Mr. BULLOCK said he knew that, but the Staffordshire Company had got new Acts. If his remarks had done nothing further than get this matter thoroughly ventilated, they had done great good. He had now to admit that his impression about Mr. Bembridge was wrong. He had explained to them what course had been pursued, and had they previously had auditors like him, this matter would have been found out long before. Mr. Lucas and the whole of the gentlemen who sat at the board had no reason to defend their integrity. He (Mr. Bullock) had not said a single word against the integrity of any one of them. What he blamed them for was for sins of omission. He blamed the chairman that when one of the auditors told him that there were items which were not entered in the ledger, Mr. Harrison was not apprehended, although he was here for weeks after.

The CHAIRMAN said Mr. Chesshire was chairman.

Mr. BULLOCK: It was mentioned to Mr. Lucas.

Mr. LUCAS said he never knew of Mr. Harrison's defalcations with reference to the Dog Show Company until after he went to Buxton.

Mr. BEMBRIDGE said he went straight to Mr. Beech and told him; and he came with Mr. Lucas from the mill, wishing to have a conversation with him.

Mr. Lucas told him he had no right to go through £87,000. Mr. Harrison was present, and had a memorandum of the date in his pocket-book.

Mr. BULLOCK: Who was the other director to whom it was told?

Mr. KEMPSON: It was I.

Mr. BULLOCK said here were two directors who knew there was a large sum of money which had been owing to the company for many years, and they took no steps to prevent the escape of Mr. Harrison. He was perfectly willing to pass the accounts, and to leave the consideration of these matters to the sub-committee. The report might be received and not adopted. He hoped the next auditors would not be satisfied with only looking at the accounts of the two districts. It was a very important matter; and in this case, if there was any error, Mr. Beech might have committed an oversight. If a professional man's name was at the bottom of a document, it ought to be correct. If he could not get at all the books and papers he wanted, he ought to say so. The sooner he did that, the sooner he would be at the top of his profession.

Mr. BEECH said he was appointed auditor in October. He told Mr. Harrison that he should have to commence a continuous audit of accounts. Mr. Harrison told him it was not at all convenient—that it was against the Act of Parliament, and that at that time a continuous audit was going on by a gentleman who was appointed from the board, who checked every item; and that therefore two sets of auditors were not necessary, and would very materially interfere with the working of the company. It was evident that, as the books were only in the auditors hands 14 days before the meeting, and the printed report had to be in the hands of the shareholders seven days before the meeting, it left but three or four days to make the audit. The books of that company could only be audited by a continuous audit, and that weekly. When they went to the office to commence the audit, he asked for the books, and Mr. Harrison asked him which books he would commence with. He replied the cash-book. The speaker was told that there was no cash-book, and the bank-book was put into his hands. He said, "This will not do for me. I will not audit accounts where there is no cash-book kept." There was no posting from the bank-book into the ledgers. The system upon which the old accounts were kept would almost defy any auditor to find out any omission in cash receipts. The collectors received money, put it into their pockets, and accounted for it as they thought best. There was no check whatever upon them. The system they had devised would prevent anything of the kind occurring in future. Mr. Beech corroborated the statements of Mr. Bembridge. The reason they only examined the accounts of two of the collectors was that there was not time to examine more. There were about 16,000 accounts, and the ledgers reached across the room. The audit of these accounts had existed upon that system for 30 or 40 years, and they did not expect to find anything wrong. They thought it right to report it to the directors, and had that report been acted upon it was probable that the deficiency would have been discovered very much earlier, for as soon as the ledgers were examined the first collector's defalcations were exposed, and he at once vanished. He believed they would find the present balance-sheet to be correct. They had taken all the steps which the time allowed to investigate the accounts, and they had written off everything that was bad or doubtful. They had gone in detail through every ledger, and checked every item with the books. There had been a complete revision of the accounts, and a new system of bookkeeping had been introduced. Certainly, no collector could go more than three months in arrear, because the system would expose it. He felt that it was to himself and to his colleague that they owed the unpleasant *exposé* which had taken place. Had it not been for their report the affair could never have been discovered until a proper investigation of the books had been made.

The CHAIRMAN withdrew his resolution, as did Mr. BULLOCK his amendment, and the report was received.

It was then carried unanimously, on the motion of the CHAIRMAN, seconded by Mr. BULLOCK—"That a committee of inquiry be appointed to investigate the accounts and all other details of the general working of the company, and to have free access to all books, papers, and documents of any kind and nature whatsoever, with power to employ such professional and other assistance as they may think proper, such committee to consist of Messrs. E. Yates, D. Malins, E. Davenport, T. Bullock, and J. C. Wynn."

The CHAIRMAN moved that the salary of Mr. Joseph Slocombe, secretary, be fixed at £500 per annum. It was quite important that the secretary should have the completest confidence of the Board, and he could say that he had been much with Mr. Slocombe, and had noticed the untiring energy and zeal with which that gentleman had worked for the company.

Mr. BULLOCK said he had been grumbling a good deal, and he was glad now to be able to do a little praise. He had great pleasure in expressing his full confidence in Mr. Slocombe, and in seconding the resolution.

The motion was then put to the meeting and carried.

Mr. YATES proposed, and Mr. BARNETT seconded, the following resolution, which, after a slight discussion, was carried:—"That the following dividends be now declared, payable by warrants to be issued for Saturday, the 30th of September, 1871, free of income tax:—On the class A shares, at the rate of 9 per cent. per annum, being 72s. per share for the half year; on the class B shares, at the rate of 9 per cent. per annum, being 7s. 2 4-10d. per share for the half year; on the 3750 new ordinary shares, at the rate of 7½ per cent. per annum, being 30s. per share for the half year; on the 1270 new ordinary (1866) shares, upon which, prior to the 30th of June last, only £30 per share had been paid, at the rate of 7½ per cent. per annum, being 22s. 6d. per share for the half year."

The CHAIRMAN said that there still remained a little business to be done. They had to supply the deficiencies of the directorate. As would have been seen by the report, Mr. S. V. Horton had resigned his office, and the directors who had at the last meeting retired by rotation were Messrs. Lucas, Collins, and Boughton. Mr. Lucas had declined to offer himself for re-election, but Messrs. Collins and Boughton were eligible, and offered themselves accordingly.

Mr. BULLOCK proposed Mr. Boughton, who was unanimously elected.

On the proposition of the CHAIRMAN, Mr. Bembridge and Mr. James Watson were unanimously elected.

On the proposition of the CHAIRMAN, Mr. Bullock was elected as an auditor, the post being left vacant by Mr. Boughton's election as a director.

On the proposition of the CHAIRMAN, a vote of thanks was tendered to Messrs. Beech and Bembridge for their services as auditors.

The following report from Mr. Edward White, the company's engineer, was then read:—

Gentlemen,—I have great pleasure in reporting that your works are in excellent condition. The alterations and extensions commenced in the spring of the present year are nearly complete. Over 100 new retorts have been erected, the engine-house enlarged, and a new engine and exhauster fixed. The double set of old pumpers have been re-arranged and increased in size, and are again at work. The set of new ones in course of erection are being rapidly completed, and the coke ground between is being considerably extended, making a valuable addition to the storeage of the works. I am happy to say we shall be well prepared to meet the increased demand for gas it is calculated the company will be called upon to supply during the coming winter.

EDWARD WHITE, Engineer.

A vote of thanks was tendered to Mr. Edward White for his services.

The proceedings were brought to a close by a vote of thanks to the chairman for presiding.

BIRMINGHAM AND STAFFORDSHIRE GAS COMPANY.

The Half-Yearly General Meeting of the Birmingham and Staffordshire Gas-light Company was held on Tuesday, Sept. 26, at the Offices of the Company, Old Square—Mr. WILLIAM SHARP, chairman of the Company, presided.

The report and accounts, which appeared in the last number of the JOURNAL, was taken as read.

The CHAIRMAN congratulated the shareholders that sufficient had been earned to enable them to declare dividends as high as they were allowed by Act of Parliament. He was also glad to say that they were in a position to enable them to reduce the price of gas; and he thought that even though that was done they might calculate on receiving the same dividends in the future that they had in the past, unless something very serious occurred to their works. He had much pleasure in moving that the report and statement of the accounts be received, adopted, and entered on the minutes.

Mr. WIGGIN seconded the motion.

Mr. LUCAS said it had been stated that he had made a statement to the effect that Mr. Laundy, the auditor, received only two guineas for his work. He begged to say that he had made no such statement. That was the rate allowed by Act of Parliament; but he was glad to find that Mr. Laundy had been appointed continuous auditor, and that he was paid at so much per hour in accordance with the usual custom. This sort of audit was the only one that could be effective.

After some remarks from the CHAIRMAN,

Mr. EDWARDS requested an explanation as to the large amount—nearly £18,000—for repairs, maintenance of works, &c. The amount was about double that of last half year, and he wished to know whether or not it was exceptional.

The CHAIRMAN explained that the amount was quite exceptional, and was rendered necessary by the renewal of a gasholder.

The motion was then carried.

On the motion of the CHAIRMAN, seconded by Mr. WIGGIN, it was resolved that a dividend be declared of 10 per cent. per annum on the capital raised under the Act of Vict. 8 and 9, and 7½ per cent. per annum on the capital raised under the Act of Vict. 21 and 22, both payable on the 29th inst.

Carried unanimously.

Mr. Howard Luckcock and Mr. H. Rotton were re-elected directors.

A vote of thanks to the chairman and directors closed the proceedings.

GAS-METER COMPANY, LIMITED.

The Annual Meeting of this Company was held at the Offices, 10, Coleman Street, London, on Thursday, Oct. 5—A. A. CROLL, Esq., in the chair.

Mr. GUYATT, the secretary *pro tem.*, having read the notice convening the meeting, the following report was presented:—

The directors have pleasure in placing before the shareholders the balance-sheet duly audited for the year ending the 30th of June last.

Great care and pains have been bestowed upon the stock-takings at the several works of the company in London, Oldham, and Dublin. Some errors, both debit and credit, in the valuation of plant and stock at the 30th of June, 1870, have been rectified, and the shareholders may have every confidence that the present balance-sheet represents the exact financial position of the company.

It will be seen by the accounts that the balance of profits now available (including the sum of £229 11s. 4d. brought from last account) is £3672 13s. 2d., and it is proposed to place £500 as a first instalment against the amount paid for goodwill at Oldham; to set aside also £500 as the nucleus of a depreciation and reserve fund; to pay a present dividend of 3 per cent. and a bonus of 1 per cent. for the half year, making, with the interim dividend paid in April, 7 per cent. for the year, after which a surplus is left of £359 13s. 2d., to be carried forward to the next revenue account.

The directors who retire at this meeting are S. Clarke, Esq., and Dr. Fraser, who, being eligible, offer themselves for re-election. Wm. Nottage, Esq., the auditor, also retires, and, being eligible, offers himself for re-election. Wm. Purvis, Esq., has resigned the office of auditor on account of ill health.

The CHAIRMAN, in moving that the report be received, adopted, and entered on the minutes, said he thought that, taking all circumstances into consideration, it might be looked upon as satisfactory. The fact, however, could not be lost sight of that the machinery of the company had, until the last six or eight months, got very much out of order. There was notthe least doubt that, great injury had been done to the interests of the concern; but, by the unremitting exertions of the old new directors, the business was now again in good working order, and, while they were enabled to recommend the present dividend, there were circumstances which justified them in anticipating a future increase in the profits of the company. He was gratified in being able to state that nothing could be more cordial than the manner in which the whole board had united in order to remedy defects existing some months ago—defects which, though sufficiently vexatious, were not of a very serious kind, or the company would not have been able in so short a time to set itself right again. The shareholders might rely upon every statement of fact and figures placed before them in the report and accounts, and that these presented them with what he might call a clean bill of health.

Mr. NICHOLSON seconded the motion for the adoption of the report.

Mr. RICE said he had not the slightest doubt as to the correctness of the statements in the report and accounts, but he thought it would be better to have the figures of the latter more at length, for the satisfaction of shareholders residing in the country, and who had not the opportunity of personally inspecting the books at the office. He wished the chairman to inform the meeting how much was paid by the company for the Oldham works. There was an item in the accounts of £500 being set aside for that property, and it would be desirable to know more about it. How long had the works been in possession of the company?

The CHAIRMAN said about six years.

Mr. RICE thought it strange that, such being the case, nothing had been written off on that account until the present time.

The CHAIRMAN said the sum paid altogether for the Oldham works was about £15,000. There came a time when it was desirable that a portion of the sum which represented the value of the goodwill of that business—about £3000—should be written off. That could not be done until now, in consequence of the large outlay which was necessary to put the old works there into a condition of thorough stability. It would require six such sums as now appeared in the accounts to be set aside to pay for the goodwill of that establishment.

Mr. NICHOLSON said it was not desirable for a company of this kind to print the minute details of its business operations, but the books were always open to the inspection of shareholders, and would furnish the most complete and satisfactory information as to the position of the undertaking. He might add, as showing the opinion of the shareholders in regard to the company, that when a few months back the directors gave the option to them of paying up the £40 uncalled on their shares, so as to save the complications arising from the existence of three classes of shares, their circular to that effect was most satisfactorily responded to, and that of the total capital of £70,000, £8500 only now remained unpaid.

The motion for the adoption of the report was put, and carried unanimously.

Mr. Stephenson Clarke and Dr. Fraser were then re-elected directors, and Mr. Nottage was re-elected an auditor of the company.

A conversation arose respecting the appointment of a new auditor in the place of Mr. Purvis, who had been compelled by illness to resign his office, and it was ultimately resolved to fill up the vacancy.

Mr. MORTON proposed that Mr. W. H. Bennett be elected to that office, believing him to be specially qualified to fill the office of auditor.

Mr. J. CHURCH seconded the motion, which was put, and carried unanimously.

The CHAIRMAN having announced that the dividend warrants had been prepared, and were ready for delivery to the shareholders present, said he should like to propose a vote of thanks to the manager and officers of the company by whom the business had been so satisfactorily conducted during the past 12 months. Previous to that time Mr. Andrews was the manager of the company's establishment in Dublin, and had always enjoyed the confidence of the board. Since he had undertaken the management of the London works, he had ably grappled with the difficulties in his path, and had done much to bring the company into its pre-

sent improved condition. Even now they could hardly look upon their affairs as in so good a position as they ought to be, and as he believed they would be; but the steps taken by Mr. Andrews, in conjunction with the board, would, he had no doubt, place them in possession of that success to which they were entitled.

Mr. NICHOLSON, as a new director, had much pleasure in endorsing the opinions expressed by the chairman in reference to the company's manager. He had carefully watched the conduct of Mr. Andrews, and felt confidence that the result of his exertions would be to place the company again upon a firm foundation, and give the shareholders a more satisfactory dividend.

Mr. BROTHERS also, as a new director, wished to express the pleasure he felt in having so able a man as Mr. Andrews at the head of the business. He had recently visited Lancashire with Mr. Andrews, and could assure the meeting that nothing was left undone by him to advance their interests.

The motion was cordially adopted.

Mr. ANDREWS acknowledged the vote, and said that next to the answer of a good conscience nothing could be so cheering to him as the appreciation of those for whom he was called to act. On his own behalf, and on behalf of the officers of the company generally, from whom he had received the utmost kindness since he became connected with the London works, he thanked the meeting for the expression of its approval, and asked from the shareholders all the co-operation they could give him in endeavouring to promote the prosperity of the company.

Mr. FINLAY proposed a vote of thanks to Mr. Rait for the services rendered by him to the company in former times. He regretted very much the absence of Mr. Rait, and especially the cause which necessitated it, and he reminded the shareholders that they were much indebted to that gentleman for his exertions at the formation of the company, and for a certain period afterwards. In Mr. Andrews the company had an efficient successor, and one who he was persuaded would do all that could be done to render good service to them.

A SHAREHOLDER seconded the motion.

The CHAIRMAN, in putting the resolution, said he was very gratified that such a vote had emanated from the meeting. He had the highest respect for Mr. Rait, and was sure this expression of the feeling of the shareholders would be most acceptable to him.

The motion was put, and carried unanimously.

A vote of thanks to the chairman and directors closed the proceedings.

SOME POINTS IN THE CHEMISTRY OF GAS LIGHTING.

A Lecture delivered before the Manchester District Association of Gas Engineers, at the Royal Institution, Manchester, on Thursday, Aug. 31, 1871,

By Dr. ODLING, F.R.S.,

Fullerian Lecturer to the Royal Institution, London.

Gentlemen,—While thinking over the subject on which I should speak to you this evening, my attention was directed to the very valuable report, recently presented to the Board of Trade by the gas referees of the metropolis, "On the Construction of Gas-Burners, with Reference to the Principles of Gas Illumination," and I may say, at starting, I think it impossible for any one to read with attention that somewhat lengthy report without recognizing its interest and importance, and without feeling how thoroughly the referees have investigated the subject before them, and how complete has been the series of experiments they have made; and it is a matter, I think, of congratulation, that gentlemen in the position of the referees should have had both the will and the opportunity to devote themselves in this way to the elucidation of points of such importance as those with which their report so competently deals. I need scarcely remind you of the general conclusion arrived at—namely, that, taking the gas-burners used in the metropolis—for it is with the consumption of gas in the metropolis that the referees are chiefly concerned—these burners on the average fail to do justice to the illuminating power of the gas consumed to the extent of fully one-fourth; so that if only three-fourths of the quantity of gas at present made in London were properly consumed, we should enjoy the same amount of light as at present, or with the quantity of gas at present made properly consumed, we should have from 25 to 30 per cent. more light than we now enjoy.

While agreeing, however, with the general conclusion of the referees, and agreeing in the main with their separate minor conclusions, I would not be understood to assent to every expression of opinion put forward in their report; on the contrary, I am inclined to call in question one or two points of detail, and further to think that they have occasionally attached excessive importance to certain particulars, and scarcely, perhaps, paid sufficient attention to others. Of course, it must be borne in mind that in an exhaustive report of this character, dealing with a complex subject on which many different opinions are entertained, it is impossible to be in agreement with everybody; and that all of us who are good for anything, whether referees or not, are in the habit of forming our own opinions upon matters submitted to us, and are not disposed to accept without question the possibly even better founded opinions of others.

I have thought, then, that I would this evening endeavour to illustrate to you some of the matters discussed in the report of the referees—both matters as to which I am perfectly in accord with them, and other matters to which I think they have scarcely given a sufficiently prominent consideration.

Now, the most casual observation and common knowledge alike show us that some flames are more luminous than others. We have here on the table gas burning from a Sugg's London Argand, which is the burner now employed as the standard, and also from a union jet or bat's-wing. When we compare the luminosity of the flames from these two burners with the luminosity of the Bunsen and blow-pipe flames beside them, we see at once that the amount of light which gas gives out in burning is not a fixed quantity under all circumstances, but is dependent upon the manner in which it is consumed.

And this applies not only to the light, but also to the heat of different flames. Here we have to make a distinction—a broad and very important distinction—between the amount and the degree of heat given out by a particular flame. When gas is completely burnt, whether we get a large amount of luminosity or not, the total quantity of heat produced in both cases shows no appreciable difference. If we consume the same quantity of gas, and burn all the hydrogen into water and all the carbon into carbonic acid, we have the same amount of heat given out. Here is a very rough calorimeter. In the centre vessel there is burning a small jet of coal gas. In this case all the heat given out by the burning of the gas is absorbed by the water, and goes to raise the temperature of that water. If we notice, after the consumption of a cubic foot of gas, how much the temperature of the water has risen, we learn the amount of heat given out by the gas; and by experiments of this kind we come to the conclusion that whether we burn the gas with a luminous flame or as a Bunsen flame, the total quantity of heat produced by the combustion of the same volume of gas is exactly the same.

But when we come to the intensity or degree of heat of any given flame, we find it as variable as is the amount of light given out. Here I have a silver spoon, which, when I hold it in an ordinary gas-flame, is not at all affected; but if, by a gentle current of air, I convert that flame into a blow-pipe flame, the spoon is melted, and runs down, as you will see, in two or three minutes. Here we have, then, a rough but striking illustration of the fact that flames differ very materially in their intensity of heat, although, as I have said, they do not differ, to an appreciable extent, at least, in the quantity of heat which they evolve, but only in the temperature or intensity of their heat.

Now, when we come to examine the conditions of gas-burning that give us the luminous flame on the one hand, and the non-luminous flame on the other, we notice a very considerable difference. Gas itself, as we are burning it here, for example, from this glass reservoir, with its usual luminous flame, is perfectly invisible, entirely like atmospheric air. In the same way, if we have a current of gas issuing into the air from an aperture, it is perfectly invisible, and we can only find out that a jet of gas is so issuing by applying a light to it. But though this is the case before the gas is set fire to, the condition is entirely different when the gas is burning. This we are enabled to demonstrate by means of a contrivance introduced by Sir Humphry Davy for an entirely different purpose. We know from experience with the safety-lamp, that flame cannot withstand the cooling influence of wire gauze. Accordingly, upon depressing a piece of wire gauze on this tall gas-flame, the flame is indeed extinguished from the height of the gauze upwards, but the gas itself passes through the gauze almost to the same height as previously, as I may show you by kindling it at the top of the gauze. The gauze simply arrests the flame, it does not arrest the passage of the mutually combustible particles of gas and air which give rise to the flame. Now observe, if we depress the gauze upon a Bunsen flame giving no light, the unconsumed gases passing through the gauze are perfectly invisible, but with a luminous flame we get a dense volume of smoke produced which we are able to set fire to on the top of the gauze. This seems to me a point to which scarcely sufficient regard has been paid in the report of the gas referees to which I have alluded—viz., that in gas combustion we have in contact with, and forming a portion of the flame, gas which is burnt, gas actually burning, and gas about to burn. But the gas about to burn is altogether different from the gas in the pipes; for whereas the gas in the pipes is perfectly invisible, the gas in the interior of the flame which is about to burn is already loaded with those sooty particles which are the causes in a great measure of its luminosity. The gas in the interior of the flame, before it begins to burn by reaching the exterior of the flame, is in this condition of decomposition, and is rendered extremely sooty, as I have just shown you; and we find that substantially it is upon the presence of these sooty particles that the luminosity of the flame more or less depends.

Now, as to the nature of these particles, whether they are solid or not; and I dare say you know that my colleague and friend, Dr. Frankland, some time back, called in question the solid character of these particles, and, indeed, advanced the opinion that the luminosity of flame did not necessarily depend upon the existence of sooty particles at all. One of the reasons he gave—certainly not the most important of his reasons—was drawn from the great transparency of luminous flame. Now you will see that a bat's-wing flame, for example, is highly transparent; and this is a point which the referees illustrate with great minuteness. If we take an upright jet of this kind, and place it behind a bat's-wing burner, you will see that its flame is perfectly visible through the bat's-wing flame. The light of the jet is not obstructed except to a very slight extent; both the blue, or slightly luminous part, and the upper, or highly luminous part, of the bat's-wing flame are, you perceive, transparent. But though transparent, they are not perfectly so; the light of the jet behind is to some extent impeded. We may enlarge the bat's-wing flame considerably by bringing another of the same kind into contact with it. While they are apart you will see that the one flame is readily visible through the other, and if we bring the two into actual contact in this manner, we get a flame of considerable magnitude, through which I have no doubt you will be able to read the printing on the card which I hold at the back; accordingly, although there is a considerable quantity of solid matter in the flame, it is not sufficient to interfere appreciably with its transparency. As at the time of an eclipse, for example, you can see the limb of the sun through a glass densely smoked, so in this instance you can see the light of one flame through the other, notwithstanding the solid particles which are spread out in its midst. These flames, though transparent, are highly charged with solid matter, and we can readily throw the shadow of such a flame upon the wall by reason of the solid particles it contains.

Now comes the question as to how this solid matter is produced. You will remember that coal gas consists substantially of carbon and hydrogen—*i.e.*, those are the combustible constituents of the gas. Now, whenever any of those hydrocarbonous compounds are subject to a strong red heat, as in the centre of a flame, they undergo decomposition, and eventually they separate into hydrogen gas and solid carbon. So that if you take coal gas and transmit it through a white-hot tube a sufficient number of times, the whole of the carbon will be deposited in the tube in the form of lamp-black and gas carbon, and finally you will obtain gas free from any luminosity. You know that the temperature inside a fully-heated gas-retort is anything but high, because it is kept down by the large amount of coal there distilling. It is only where the produced gas comes in contact with the sides of the retort itself that it becomes intensely hot, and there you get depositions of gas carbon.

But there is yet another reason for the formation of soot in the as yet unburnt gas of a flame—one which I shall have to consider more minutely presently—namely, that in the burning of gas the combustible constituents of that gas—the carbon and the hydrogen—both enter into union with the oxygen of the air. But in the interior of the flame there is necessarily an insufficient supply of air; in fact, the only air that gets there is introduced, as it were, accidentally by a process of mixture, and this quantity is insufficient to consume the whole of both the carbon and the hydrogen. Under these circumstances, the hydrogen is preferentially burnt; and the carbon, therefore, is left unburnt in the form of soot. So that it is deposited from two causes—first as a result of the decomposition by heat, and then by the burning away of the hydrogen so as to leave the carbon behind. Accordingly, when we want to get a luminous flame, we must contrive to prevent, as much as possible, the mixture of the oxygen of the air with the interior of the flame, because, if the oxygen introduced is considerable, it not only unites with the hydrogen, but with the carbon, without setting the carbon free; and, as in the well-known Bunsen burner, it thus destroys the luminosity of the flame. If, with a Bunsen burner, I cut off a portion of the air supply by stopping some of the holes with my fingers, I get a light-giving flame by reason of the diminution of the supply of the atmospheric air to the interior of the flame.

Again, in respect to the luminosity of flame, it is not only a question of great importance, the *quantity* of air supplied to the gas, but also, and far more importantly, the *manner* in which it is supplied—whether so as to produce a maximum, or minimum, or intermediate degree of intermixture.

The two substances with which we have to deal—namely, air and gas—can only burn when they come into contact one with the other; and with a jet of gas issuing under a very low pressure we get, as it were, a thin shell of flame, dividing the jet of gas from the surrounding air. If we could contrive that the degree of mixture between the internal gas and the external air should be reduced to a minimum, it would become an exceedingly thin shell.

This hollowness of flame is capable of being demonstrated in a variety of ways, and in some which, at first sight, would hardly be expected. Even in a Bunsen flame the quantity of air admitted is not sufficient to burn the gas throughout, and the flame is consequently, to a large extent, hollow, as I may be able to show by one or two simple experiments. I take a piece of platinum wire, and hold it in the flame. You see that there are just two points, and two points only, where the wire becomes incandescent, and that so much of the wire as is in the centre of the flame, where, comparatively speaking, no burning is going on, remains entirely black. It is only at the margin, where the air and the gas come into contact the one with the other, that the wire becomes red hot.

I may illustrate the same thing to you also by using an ordinary lucifer match. I hold it across the flame, and you see it is simply charred at the two points where the air and the gas come into contact—the portion of the match in the centre of the flame being perfectly uncharred.

More strikingly, I may show you the same thing if I take a fresh lucifer-match and pass its dipped end quickly through the shell of the flame. You see we can do this without the end taking fire, but the moment it is withdrawn

slowly through the shell of flame it becomes ignited. This shows you how cold is the interior even of the Bunsen flame under these circumstances. If we operate with a very large flame, the fact of its hollowness may be shown most conclusively in a somewhat different way. You see that, on holding a sheet of stiff paper steadily over this large gas-flame so as to depress the flame, the paper becomes charred in a well-defined ring—not more in the centre, where it is in contact with gas alone, than at the edges, where it is in contact with air alone, but only at the intermediate circle, where it is in contact with gas and air simultaneously.

More apparent still. If we take an ordinary Argand burner, the aperture and gallery of which are completely stopped, so that the gas burns only from the top of the glass chimney, you will see at once that we have an obviously hollow flame. On introducing a lighted gas-jet into the centre of it, the light is, you perceive, completely extinguished.

Again, on introducing a piece of burning phosphorus into the centre of this gas-flame, the flame of the phosphorus is at once extinguished. This being so, it follows that wherever the air and gas come into contact with one another, there, and there only, do we have combustion going on. Under ordinary circumstances we say the gas burns, because the gas is surrounded by air. But if we arrange matters in another form, so as to have the gas inside and the air outside, we might then say that the air burns in the gas by which it is surrounded.

The interior of this tall glass cylinder or enlarged lamp-chimney, is practically full of gas supplied to it by a piece of vulcanite tube, and I am able, you perceive, to inflame the gas at the top of the cylinder, where it burns as gas usually does. The bottom of the cylinder is closed by a cork, through which there passes a short, somewhat wide piece of glass tubing open at both ends, so that its upper end is in communication with the gas in the cylinder, and its lower end with the external air, which is being gradually sucked in by the draught. Now, on passing a lighted taper quickly up this piece of glass tube, a flame is produced at the top of the piece of tube, where the air flows into the surrounding coal gas, so that we now have two flames instead of one—namely, at the top of the cylinder gas burning in air as usual, and at the bottom of the cylinder air burning in the midst of coal gas. The air being thus surrounded by an atmosphere of coal gas, you may say, if you like, that the air is burning. In reality, we have only a column of gas, which comes into contact with the air at the top and at the bottom of the cylinder in this way. At the one end the gas is made to appear to burn, at the other end the air. But the air is no more burning in the lower jet than at the upper; it is merely that the flame takes place just at the two spots where the air and gas come into contact with each other.

Now I have just been observing that the air and gas only burn when they come in contact with one another. If we take the precaution to mix the two together in suitable proportions, we get an explosive mixture which burns throughout with flame. Here we have a small quantity of coal gas mixed with air, so that every particle of gas is intermingled with particles of air, and we shall have now one entire solid mass of flame—no longer a shell of flame—and the combustion takes place simultaneously throughout the mass with a loud explosion.

In order, then, to get a luminous flame, we require, as I have said, a certain amount of mixture, so that the shell shall not be too thin, and we want to avoid too great a degree of mixture, so that we may get those sooty particles formed, to the ignition of which the light is mainly due; and, in pursuance of this consideration, I want now to call your attention to the manner in which gas and air mix together. And, in doing so, I may for a moment refer to the similar manner in which liquids mix together, because with them I can show you the result more visibly. If we take a heavy and a light liquid—say water for the light, and oil of vitriol, which is about 1¾ times heavier, for the heavy liquid—you will find that we can very readily pour the heavy liquid through the light, so as to have two distinct layers in the vessel. There is, it is true, a certain amount of intermixture taking place, but, nevertheless, the oil of vitriol, which I have purposely coloured blue to render it visible, descends, you see, in great measure to the bottom, and there forms a layer more or less distinct.

Just in the same way that a heavy liquid is capable of being poured through a light liquid with only a small amount of admixture, so, in precisely a similar manner, are we able to pour a heavy gas through a light one. This I may be able to illustrate to you by means of the balance. If we take a beaker, and counterpoise it carefully, we may pour into it the contents of this bottle of carbonic acid gas (which is a heavy gas), through the air, just as we poured the oil of vitriol through the water, with only a comparatively small amount of admixture taking place. The beaker is now heavier than before, as shown you by the descent of the balance; and if we test its contents by means of a light, we find that it is full of carbonic gas, for the light is immediately extinguished.

But what we have to do with chiefly is not the passage of a heavy gas through a comparatively light one, but of coal gas (which is a light gas) through the comparatively heavy air; and here we are able to show the result in a similar manner, first of all making an illustrative experiment with liquids.

I have here a vessel containing coloured spirits of wine, which I shall be able to pour upwards through a vessel of colourless water, which is heavier; just as in the former case I poured the oil of vitriol downwards through the water, which was lighter. In this case also a certain amount of admixture takes place during the process, but substantially the light liquid is poured upwards through the heavy one—the inverted beaker, at first full of colourless water, being now filled, you perceive, with the red spirits of wine.

In the same way a light gas is capable of being poured upwards through a heavy one, as I will now show you. Again I balance the beaker, suspending it as a bell—indeed, if anything, it is heavier than the counterpoise. I now take a bottle of coal gas, and pour it in, as it were, upwards from the bottom. The gas ascends into the beaker, which immediately begins to rise, from the lightness of its new contents, and if we introduce a light, you will find that we are enabled to inflame the gas which we have poured upwards into it. The issue of gas from a burner—a Lowe's jet, for example—may also be illustrated by the issue or discharge of one liquid into another. For example, if we take a pipette of this kind containing a light liquid coloured red, and let the pipette fall into a tall jar of water, we shall see the very gradual way in which the current or jet of light liquid rises up through the comparatively heavy water, so as to form a layer on the top of the water. Just in the same way with a jet of gas rising through the air, there is a certain amount of admixture effected, but we find that the tendency of the gas to rise in mass is much more evident than its tendency to intermingle.

Accordingly, when gas issues from these different burners, and more particularly from Lowe's jet, if there is a very low pressure the admixture is slight; but where gas is burned under high pressure a considerable amount of agitation is created, and admixture takes place whereby the luminosity of the flame is much interfered with. Thus it is that with an Argand burner the luminosity of the flame is greatest when the gas rises with the lowest pressure—the draught effecting a sufficient admixture of air to render the shell of flame tolerably thick, but not producing that complete intermixture of gas and air which takes place in a Bunsen flame. In an ordinary luminous flame, as that of a Lowe's jet, the issuing gas being surrounded by a shell of flame, the gas existing at any instant within the shell is heated and decomposed; so that, as I have before remarked, it is not the original gas, but the products of its decomposition by heat, which eventually burn and furnish light. Where the gas is previously mixed with an insufficient proportion of air, as in Bunsen's arrangement, an imperfect combustion takes place in the centre of the flame, and the invisible, combustible, but no longer sooty products, coming into contact with the exterior air, there undergo a complete combustion, furnishing a flame that is devoid, or nearly devoid, of luminosity. Accordingly, in discussing the conditions necessary for the production of a highly luminous flame, it is necessary to consider not only the greater or less quantity of air supplied to the flame, but also the manner in which it is supplied, so as to bring about a sufficient, but not an excessive, degree of admixture of the air and gas with one another. For example, from this glass reservoir full of coal gas, which I now open at top and bottom, the light coal gas rises up quietly through the heavy air, just as you saw the coloured light spirit in the pipette rise up through the colourless heavy water a moment ago, by reason of its levity. If I connect the lower opening of the reservoir with our gas supply, the gas now issues from the upper opening more forcibly by reason of the pressure in the main; and in finding its way upwards as an ascending current—rubbing, so to speak, against the surrounding air, through which it forces its passage—undergoes a considerable amount of mechanical mixture therewith; but, nevertheless, in an otherwise quiescent atmosphere, a considerable proportion of the issuing gas does rise bodily to the ceiling of the room, and there accumulates. There seems to be a notion prevalent that gas and air intermix so rapidly by the process of diffusion—on which I shall have to say a word or two presently—as to prevent the possibility of any accumulation of gas taking place, near the ceiling, for instance. But this is very far from being the fact. Indeed, the mechanical admixture of a current of gas with the surrounding air offers a far greater hindrance to its accumulation than does its molecular admixture by the process of diffusion; but in cases where the gas issues under a low pressure from a considerable orifice, it does really, by virtue of its levity, rise through the air without any considerable degree of intermixture taking place. It rises up to the top of the room, and may remain there for an appreciable time—the greater part of what intermixture does take place being due to the friction of the issuing gas against the surrounding air through which it forces its way.

But when gas issuing from a jet is inflamed, a new condition of things is established. The gas, in burning, gives out heat, and the products of its combustion—namely, steam, carbonic acid, and the nitrogen of the consumed air—are at a very high degree of temperature, as is also the unconsumed air contiguous to the flame, and these heated gases ascend rapidly. It is by reason of the current so produced that we get, not a uniformly cylindrical, but a sharply conical gas-flame. An upward current is established by the ascent of the heated gases, whereby the surrounding air is sucked in, and so brought into contact with the flame, and intermixed more or less with the burning gas. It is not, then, correct to say that, in the case of a naked gas-flame, air is brought into contact with the flame solely by reason of the pressure on the main urging the gas through the air. The supply or admixture of fresh air is largely dependent upon the ascent of the heated products creating a tendency to a vacuum, towards which air rushes in from all directions. The use of a chimney does not establish, but only intensifies the upward current; and, as we shall hereafter see, not only does a long chimney interfere with the luminosity of the flame by reason of the excess of air it brings into contact therewith, but also—and this is a point of very considerable importance—by reason of the degree of intermixture effected between the gas and air, as a consequence of the sharpness of the draught.

So far all the mixture of which we have spoken is more or less accidental—due, that is to say, to agitation and friction. But, quite irrespective of this there is an active degree of mixture taking place between the air and gas, where they come into contact, which constitutes diffusion. Now, the process of mixture by diffusion is best studied where all mechanical admixture is reduced to a minimum. If I take an ordinary vial, to the mouth of which a strong narrow piece of glass tube is attached by means of a perforated cork, and if I completely fill the vial and attached piece of tube with coal gas, and then support the vial steadily in an inverted position, very little mechanical intermixture of the gas within and the air without can possibly take place. The coal gas, by reason of its lightness, tends to remain in the inverted vial above the comparatively heavy air, with which it only comes into contact at the free end of the narrow piece of tube; and so far as any mechanical agitation is concerned, we might expect the inverted vial to remain full of gas for an almost indefinite period. But such is far from being the case. After a little while it will be found that all the light coal gas will have passed downwards out of the vial, and only air be found therein. I may illustrate this process of diffusion to you in another way. Through this glass cylinder is now passing a stream of coal gas, which you see burning from the attached glass jet. This other similar cylinder is full of carbonic acid gas, as is evident to you by the flame of the taper which I introduce being at once extinguished. Now, the probability is that the carbonic gas is about twice as heavy as this particular coal gas. I now invert the cylinder of light coal gas over the cylinder of heavy carbonic gas, so that the two gases can only communicate with each other through the intervening piece of narrow glass tubing, whereby the amount of mechanical agitation which can take place between them is rendered exceedingly small. Nevertheless, in the course of half an hour or so, we should find that the composition of the gas in the two cylinders was identical—that the light coal gas had descended, and the heavy carbonic gas had ascended by mutual inter-diffusion, until a perfectly uniform mixture of the two had been effected. Instead of allowing the two gases to communicate through a piece of tubing more or less wide, we may allow them to communicate only through the minute pores of a piece of stucco. These pores are so small as to be impervious to the bodily passage of gas through them; that is to say, that the resistance to the bodily transmission of the gas through such minute pores is greater than the available pressure can overcome. Nevertheless the process of diffusion can take place perfectly through the interspace afforded by the sum of the areas of the pores. I have here two tall glass tubes, closed at the tops with plugs of stucco, filled with hydrogen gas, and standing, the one in mercury, the other in coloured water. On uncovering the stucco plugs, the hydrogen in the tubes diffuses outwards, through the pores of the stucco, into the surrounding air, and the surrounding air diffuses inwards through the stucco into the hydrogen; but, inasmuch as the diffusion velocity of hydrogen is nearly four times as great as that of air, very nearly four times as much hydrogen escapes from, as of air enters into the tubes; whereby, you see, the coloured water is already sucked up in the one tube to a very considerable height, and even the heavy mercury in the other tube is sucked up to the height of a couple of inches, and will gradually rise yet higher. You will remember that the diffusibility of a gas goes with its lightness; or, to speak more accurately, is inversely proportional to the square root of its specific gravity; so that if you have a mixture of two gases of widely different specific gravities in an open bottle, for instance, the lighter of the two diffuses out of the bottle into the surrounding air far more quickly than does the other. Anyhow, when a stream of gas, whether or not inflamed, issues from an orifice, the issuing gas intermixes itself to some extent with the surrounding air by an active process of diffusion, as well as to a far larger extent by the mechanical agitation and friction consequent on the force of its propulsion.

Reverting to the causes of the luminosity of flame, it is found that not only solid but even gaseous particles when sufficiently heated become luminous. We have a familiar instance of this, in the luminosity of the lightning flash. In this case the luminosity depends not on the mere ignition of finely divided solid, but upon the intense ignition of gaseous or aërial substance. It requires, however, an extremely intense heat to render gaseous matter luminous; whereas solid particles, such as those of the soot existing in ordinary flames, are luminous, even at a dull red heat, and, one and the same temperature being maintained, the luminosity of the flame will be proportionate to its sootiness—that is, to the number of the particles of ignited soot radiating light at the instant. But the degree of luminosity of the solid particles increases

very rapidly with their temperature; the higher the temperature to which they are raised, the more luminous they become, so that we have to consider two points—firstly, the amount of soot in the flame at any moment, which, by being ignited, can become a source of light; and, secondly, the intensity of the temperature to which each individual particle of soot is heated. Accordingly in many flames the luminosity may be increased, by increasing instead of diminishing the supply of air; for though in this way a smaller number of soot particles are existent at each moment of the combustion, still those which do exist are more strongly heated, whereby they become more luminous. With respect to all gas-burners then, in order for them to elicit the maximum of light which the gas is capable of giving, we must not have too rapid a combustion, because, if we do, we burn away the sooty particles too rapidly; on the other hand, we must have a sufficiently sharp combustion, otherwise, although we may have an abundance of sooty particles, they are raised to so low a temperature only as to be incapable of giving a large amount of light. I have here an ordinary old-fashioned Argand burner, with small holes for the issue of the gas, and I place on the gallery a glass chimney 14 inches high—that is, of double the usual height—and as a result we get a short, white, and but sparingly luminous flame, the temperature of which, however, is very considerable. I now place on the top of the chimney a small metal ring, so as to constrict its aperture, and thereby check the draught, and you see at once that the flame becomes larger, more opaque, more luminous, and of a richer or yellower tint. A greater number of sooty particles are being ignited, but the flame does not smoke, and the combustion is doubtless as complete as it was in the first instance. The amount of heat given out by the combustion is accordingly the same as before, though the temperature o the flame is doubtless lower. I now check the draught still more by substituting for the first metal ring another one with a much smaller aperture, and as a result the size of the flame is increased very considerably, without, however, a proportionate increase—and, indeed, with a decrease—of light. The flame itself has a smoky appearance, and unburnt soot escapes from the top of the chimney. The combustion is imperfect from deficiency of air, and we get but a feebly luminous orange flame, because the sooty particles, though more abundant even than before, are not raised to anything like so high a temperature. I now remove the metal ring from the top of the chimney altogether, and once more we get the short white flame, half the size of that we had a moment ago, and deficient in luminosity by reason of the excess of air, as the last one was by reason of the defect of air supplied; so that, in this question of burners, there are two principal points to be considered, or two difficulties to be avoided. We require such a supply of air or sharpness of draught as shall give us a flame of a high degree of temperature, whereby the soot particles may be intensely heated; and we require to avoid any such excess of air as shall burn off the sooty particles too rapidly to allow of any considerable number of them being in existence at the same moment; and I may add, we require almost a minimum degree of admixture between the gas and air, so as to allow of sooty particles being formed in the gas in sufficient abundance.

The effect of a rush of air in diminishing the luminosity of flame may be well shown in this manner: I have here a Leslie burner, which is extremely well adapted for the purpose. It is provided now with its shortest chimney, through which, however, an abundant current of air is passing, so as to burn the gas rapidly, and produce an intensely hot, perfectly white, sharply-defined flame. In fact, the gas is even now being what is called "over-burnt," though the expression is scarcely a correct one, for do what we will we can but burn gas completely into carbonic acid and water. I now suspend over its proper chimney our 14-inch chimney that we used a moment ago, and what is the effect. I get as much heat as before—the same quantity of gas that was being completely burned a moment ago being completely burned now—but I have reduced the size of the flame to not more than one-fourth of what it was, and reduced its luminosity to even a greater extent. On removing the additional tall chimney you see the flame at once jump up to its original height. One merit of the London standard Argand burner is that while it allows the 5 cubic feet of gas to issue from it under a very low pressure, the adjustment of the apertures for admission of air and the height of the burner are such as to afford a sufficient supply of air without there being such a sharp draught as would lead to an excessive admixture of the issuing gas with the air. By lessening the area for the admission of air, and at the same time heightening the chimney, I can supply the gas with approximately the same quantity of air as before, but you perceive I diminish the luminosity of the flame very considerably, by reason of the greater degree of admixture that now takes place between the air and gas.

With regard to quantities, the minimum quantity of air that must be mixed with coal gas to effect its complete explosion varies with the quality of the gas, but may be taken at about eight times its volume. In order, however, to maintain the free combustion of a jet of gas, a very much larger proportion of air is required; because it is necessary that the air which is partially exhausted of oxygen, and contaminated with products of combustion, should be as rapidly as may be removed, and replaced by fresh air. Indeed, it is scarcely practicable to keep a jet of gas burning continuously without affording it from 25 to 30 times its volume of air; and even this proportion may be largely exceeded before the loss of effect by cooling counterbalances the gain of effect by free combustion.

And now, in bringing this lecture to a termination, I must apologize—not as a mere matter of form, but in all sincerity—for having brought the subject under your notice in so imperfect a fashion. But the fact is, I have been so driven during the past week, or longer, with other pressing matters which have devolved on me quite unexpectedly, that two days ago it was doubtful even whether I should be able to fulfil my engagement with you at all. All the more, then, am I indebted to you for the kind patience with which you have listened to me. And I must further express, in conclusion, my best thanks to Professor Calvert for having so kindly allowed me not only the use of his laboratory here, but also the very valuable services of his assistant, Mr. Thomson, in preparing and performing the different experimental illustrations to which I have had the privilege of directing your attention this evening.

THE DUBLIN WATER SUPPLY.

The *Freeman's Journal* says:—The Dublin public will remember the strange letter of "Fresh Water," originally printed in the *Times*, and since then copied very generally into the Irish press, in which the Vartry waters were denounced as "poisoned water," and the heads of the medical profession in Dublin, especially the dwellers in Merrion Square, were accused of favouring "poisoned water" in order to win fees and live in splendid mansions. To the *Evening Mail* the Dublin public are indebted for a spirited refutation of the slander on the profession and the libel on the Dublin water supply. One of the proprietors of this journal being chairman of the Water-Works Committee, he deemed it right, instead of replying through these columns, to answer, over his own signature, the chief assertions indulged in by the anonymous writer, and to wait with patience till it would be the convenience of the conductors of the *Times* to grant him the favour of inserting his letter. Adopting the same policy, we confine ourselves for the present to reproducting the letter from Sir John Gray, which appeared in the *Times*:—

TO THE EDITOR OF THE TIMES.

Charleville House, Dublin, Sept. 23, 1871.

Sir,—I have just read in the *Times*, under the heading "Poisoned Water," a letter signed "Fresh Water," in which are embodied a series of statements with respect to the Vartry water now supplied to this city, from which I select the following. Your correspondent says—

1. "The Vartry water, which is supplied to every house in Dublin, is so bad that scarcely any one can drink it."

2. "The conductors of the water-works have just advertised in a leading Dublin journal that they have stocked the river with a fine stock of fish, and they invite anglers to come and enjoy the sport."

3. "In consequence of the abominable taste of the Vartry water, almost every private house of any pretension has a pump in the back yard."

The writer adds what will be additional news to every person in Dublin, viz.—"That families arriving in Dublin, from the north and south of Ireland, 'bring up their drinking water with them in stone jars from their country places.'"

As I am mainly responsible for the introduction of the Vartry water into Dublin, I ask your permission to make a few brief observations on the assertions of your anonymous correspondent. The Vartry waters are derived from a watershed situated in a sparsely populated pastoral district in the Wicklow Mountains, and, prior to their adoption as the water supply of Dublin, were chemically examined by Sir Robert Kane, Professor Apjohn, Professor Sullivan, and, amongst other engineers, Mr. Hawkshaw, Mr. Hawksley, Mr. J. F. Bateman, and Mr. Rawlinson, by all of whom the waters were approved of as being almost chemically pure, entirely free from mineral and organic taint, and identical in character with the Loch Katrine waters—now universally taken as the standard water supply of the United Kingdom. As chairman of the Water-Works Committee, appointed at my suggestion to procure a suitable supply of water for Dublin, I necessarily took a leading part in all the public discussions and private investigations of the water question—in framing the Dublin Water Act, and in carrying it into operation; and during the whole period—extending over nearly twelve years—I never heard, even from the opponents of the scheme, a suggestion that the waters were not of the most pure and wholesome character.

Now, as to the specific statements of "Fresh Water," I aver that, since the first introduction of these waters into Dublin and into the several incorporated townships which surround the city, there has not been even a solitary complaint of the wholesomeness of the water laid before the Water Committee, either from the commissioners of the townships or from any inhabitant of Dublin. This fact I am in a position to vouch as the chairman of the committee.

To the second statement my reply is, that it is not only altogether untrue, but that the assertion is without the shadow of a foundation. The committee did not stock the reservoir with fish—a single fish or even a solitary ovum has not been introduced by them, or any one of them, or by any officer or servant of theirs, or by any other person with their knowledge, concurrence, or consent, or, so far as I can ascertain from our caretakers, *without* their knowledge. The "advertisement" said to have been inserted in a leading journal is an *impure* invention—no such advertisement appeared in any Dublin paper, and the statement that it did is simply untrue.

As to the third statement, there is no disputing about taste. Persons accustomed to drink hard, sparkling waters, such as were once drawn from the Bond Street pump of memorable notoriety in London, may not relish pure, soft water, such as that of the Vartry. That some eccentric or hypochondriacal persons may have carried jars of water to Dublin is possible, but no person in Dublin would believe that it is done by sane persons. As evidence of the estimation in which the water is held by the citizens of Dublin, I beg to assure you that our committee, which meets weekly, are more troubled and annoyed by the numerous and urgent petitions and prayers for a supply of Vartry water to the country houses of merchants and professional men situate *outside* the municipal limits than by any other class of applications.

The suggestion that the medical men of Dublin—the Stokes's, the Corrigans, the Hudsons, the Wildes, and others of European fame—encourage the use of the "Poisoned Waters" of the Vartry in order that they may dwell in the superb mansions erected for the Irish nobility of other days, is so gross an outrage on the distinguished profession of which these men are brilliant ornaments, that I will not do more than allude to it. As chairman, my duty is to deal with the assertions, not with the base insinuations of "Fresh Water," and to each and all of them I give the most emphatic denial of their truth which is consistent with the respect due to your columns.—I am, sir, your obedient servant,

JOHN GRAY, Chairman of the Dublin Water-Works Committee.

—*Dublin Evening Telegraph.*

AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS, IN SEPTEMBER, 1871.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	16·57	0·127	0·125	0·002	13·2	3·3
West Middlesex	16·53	0·030	0·112	0·000	13·3	3·3
Southwark and Vauxhall	16·27	0·077	0·111	0·002	13·0	3·3
Chelsea	16·80	0·081	0·125	0·002	13·4	3·3
Lambeth	17·27	0·077	0·110	0·002	13·8	3·4
Other Companies.						
Kent	27·23	0·010	0·196	0·000	20·0	5·6
New River	16·43	0·021	0·126	0·000	13·5	3·0
East London	15·27	0·051	0·135	0·000	12·1	3·5

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was more or less turbid—namely, in the case of the Chelsea and the Grand Junction water The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 116,327,971 gallons; and the number of houses supplied was 489,544. This is at the rate of 35·6 gallons per head of the population daily.

HY. LETHEBY, M.B.

DR. STEVENSON'S REPORT ON THE ILLUMINATING POWER OF THE GAS SUPPLIED IN ST. PANCRAS, IN SEPTEMBER, 1871.—The average illuminating power of the gas during the month of September was 14·2 candles, the maximum being 14·8, and the minimum 13·7 candles, the measurements being made according to the provisions of the Metropolis Gas Act, 1860. The new Imperial Gas Act directs a minimum of 14 candles. The gas was of about the usual illuminating power. Of impurities, ammonia in small quantity was present on every occasion of examination, but was never in excess; whilst suphuretted hydrogen was never detected. Sulphur was present to the extent of 20·25 grains per 100 cubic feet; this is about the average amount. THOS. STEVENSON.

HUDDERSFIELD NEW WATER-WORKS.—On Thursday, Sept. 21, the laying of the foundations of the shaft and culvert of the Deerhill reservoir was performed by the mayor (C. H. Jones, Esq.), in the presence of a numerous company, consisting of members of the corporation and other gentlemen. The present scheme for the improved supply of water to this important manufacturing town was devised by Mr. Hawksley, in conjunction with Mr. Crowther. It received the sanction of Parliament in 1869, and will be completed in 1873, at an estimated cost of £191,500. It is calculated to supply a population of 100,000 persons with about 24 gallons per head per day, and to furnish compensation equal to one million and a quarter gallons. The total storeage amounts to a consumption for 200 days, of which the Deerhill reservoir represents about 120 million gallons. After the ceremony of laying the stone, the company were entertained at a dinner, presided over by the mayor, at which, in acknowledging the toast of "The health of Mr. Hawksley and Mr. Crowther," the former gave a long and interesting account of the origination and progress of the works.

THE PATENT CATOPTRIC LAMP.—Mr. Skelton, of Essex Street, Strand, has invented and patented a new description of lamp for street lighting, which was

tried in public last Friday for the first time, on Waterloo Bridge. The principle of the invention is the application of reflectors, in order to bend down and utilize the amount of light which is at present wasted by upward radiation. It is manifest that the rays of light from a street-lamp which now strike the eye of a spectator placed on the ground are only a small portion of those actually emitted by the flames. The rays which pass through the upper portions of the sides of the lantern, or through its sloping roof, are entirely dissipated; or at best, if partially and imperfectly reflected by clouds or atmospheric particles, become visible only in the form of the red glow which overhangs a distant town. Mr. Skelton calculates that about two-thirds of the light given by the gas-flame are in this way lost, and he has arranged strips of looking-glass in such a way that the loss will be effectually prevented. The upper half of each side of the lamp and the whole of each side of the sloping roof are occupied by a frame, in which the strips are placed with their reflecting surfaces downwards, in a manner somewhat analogous to the laths of a Venetian blind. The precise character of the effect produced will depend upon the distance of the strips apart, upon their width, and upon their angle of inclination; but the general result is, subject to small variations, that the street receives three times as much light as would fall upon it through lanterns of the ordinary kind. The frames holding the strips are glazed on both sides, and made dust-proof, so that the mirrors will not themselves become soiled or tarnished, and the reflector as a whole can be cleaned in the ordinary way, by simply wiping the glass. The price of the apparatus will be very moderate, and Mr. Skelton estimates that the illuminating power of any given quantity of gas may be trebled, at an increase of about 5 per cent. on the present annual cost. The plan is equally applicable to every form of lamp, and the patent includes the application of prismatic reflectors, which would present advantages in certain cases.—*Times.*

Register of New Patents.

2472.—Thomas Onion, of 12, Leicester Road, Loughborough, in the co. of Leicester, for "*Improvements in apparatus for measuring the flow of water or other liquids.*" Provisional protection only obtained. Dated Sept. 14, 1870.

In carrying out this invention a cylindrical case is employed, with closed ends. Within this cylindrical case is applied another cylinder working closely with the ends of it, but so as to leave an annular space between the outer surface of the inner cylinder and the inner surface of the outer cylinder or case. The inner cylinder is applied to a shaft supported on bearings in the case to enable it to revolve truly therein. The outer case is provided with abutments on opposite sides of the annular space referred to, and extending from its inner surface to the outer surface of the inner cylinder. There are passages to the interior of the outer case, one near each abutment, to conduct the liquid to be measured, whilst there is a separate passage on the opposite side of each abutment to conduct away the liquid after measurement. The inner cylinder is provided with four sliding-plates which act as pistons, and are controlled in their motion so as in the rotation of the inner cylinder to pass within the periphery thereof at the time they are passing the abutments, and then they project across the annular space in the intervening parts.

2497.—Isaac Haigh, John Haigh, and Isaac Haigh, jun., of West Bromwich, in the co. of Stafford, plumbers, for "*Certain improvements in apparatus in connexion with water-closets.*" Patent dated Sept. 16, 1870.

This invention relates to improved means for flushing water-closets, and consists in the application to the ordinary syphon (as applied to a small reservoir or flush-box) of an additional controllable vent way, fitted with a valve and seat, the valve being connected by a chain and link, or other suitable means, to a balance-lever. The link may encompass the lever of the ball connected with the tap for controlling the supply, or be otherwise arranged.

2505.—Thomas Walton, of the firm of Walton and Brear, of Bradford, in the co. of York, plumbers, glaziers, gas and steam fitters, for "*An improved means or apparatus for ventilating rooms or buildings.*" Provisional protection only obtained. Dated Sept. 17, 1870.

This invention consists in constructing or forming a slit or opening in the upper or top part of the window in the glazing, by placing one sheet of glass outside of, and overlapping or overlying another sheet of glass, leaving a space between the two sheets for the admission of air. At the top of this slit a flap or cover is hinged, so as to close the opening when required, but which can be readily opened by a string attached thereto, and thence passed over pulleys arranged so as to conduct it to any convenient part of the building.

2506.—Edward Kidd, of Birmingham, in the co. of Warwick, manufacturer, and George Bourne, of the same place, engineer, for "*An improved water-gauge.*" Provisional protection only obtained. Dated Sept. 17, 1870.

In carrying out this invention, a cylinder of metal, and by means of cores a central recess or chamber, is formed, with a series of openings therein. Two of the openings are opposite each other, one of them being altogether or partially screwed interiorly for the reception of a bolt, which is also screwed at the end contiguous to its head. At the other end of the bolt there is a circular rim or collar, the sides of which are slightly bevelled from the periphery. The inner ends of the two opposite openings in the chamber are countersunk, and into these the circular rim or collar is rotated at desired intervals. A disc or plate of metal and an ordinary glass tube for steam and water are used conjunctively.

2516.—Gustav Bischof, jun., of Bonn, in the kingdom of Prussia, but at present residing at the Craven Hotel, Craven Street, Strand, in the co. of Middlesex, for "*Improvements in the means employed for the purification of water.*" Provisional protection only obtained. Dated Sept. 19, 1870.

The means proposed to be employed for purifying water is the so-called "spongy iron," which has been reduced without fusion by any of the known means, instead of employing for this purpose iron that has been fused. For preparing such spongy iron, any one of the oxides or salts of iron may be used, but preferably the so-called purple or spent ore which is obtained after the copper has been extracted by the wet process from impurities.

2517.—Henry Harris, of Southampton, in the co. of Hants, picture restorer, for "*Improvements in filtering and in apparatus for the purpose.*" Patent dated Sept. 19, 1870.

According to this invention there is attached to or connected with the water service or supply pipe a filter or filtering vessel or chamber containing three or more compartments formed by fitting in the vessel or chamber partitions made of perforated metal, wire gauze, or other pierced, perforated, or reticulated material, and the compartments are arranged one before the other or one next the other, so that the water shall pass from the service or supply pipe into each compartment in succession, and be discharged from the last of the series by a spout, pipe, or outlet, which is furnished with a tap or other like appliance. Perforated plates, wire cloth discs, or pieces of similar perforated or reticulated material are placed with regard to the service-pipe and the outlet in such manner that the water in passing to and from the filtering-chamber, shall pass through such perforated or reticulated material. The compartments contain filtering agents or media, gravel, compressed sponge, charcoal, and pumice stone being in some cases recommended.

APPLICATIONS FOR LETTERS PATENT.

2495.—James Banks, of Liverpool, in the co. of Lancaster, iron fence manufacturer, and William Walker, of the same place, consulting engineer, for "*An improved system for the treatment of sewage, parts of which are applicable to the filtration of water for the use of towns, and other liquids, on an extensive scale.*" Sept. 22, 1871.

2496.—Theodore Deffis, of Rue Richer, Paris, for "*Improvements in glass lights.*" A communication. (Complete specification.) Sept. 22, 1871.

2497.—John Williamson, of 25, Warren Street, Stockport, in the co. of Chester, and William Glazier, of 235, Drake Street, Rochdale, in the co. of Lancaster, for "*Improvements in dry closets or privies and commodes.*" Sept. 22, 1871.

2507.—Niels Ludvig Martinus Smith, of the city of Glasgow, in the co. of Lanark, N.B., engineer, for "*A new water-meter or rotary wheel or machine, suitable also as an air and gas blower or exhauster, and as a pump for raising or forcing liquids, and as an hydraulic or steam motor.*" Sept. 22, 1871.

2510.—William Edward Gedge, of 11, Wellington Street, Strand, in the co. of Middlesex, patent agent, for "*A new or improved lighting and heating apparatus.*" A communication. Sept. 23, 1871.

2511.—James Verity, of 1, Carlton Road, Kentish Town, in the co. of Middlesex, for "*Improvements in the construction of chimneys for gas-burners and oil and other lamps, and in reflectors for the same.*" Sept. 23, 1871.

2512.—John Bell Muschamp, of Kensington, in the co. of Middlesex, paper maker, for "*A new or improved liquid-meter.*" Sept. 23, 1871.

2526.—Charles Wall, of Birmingham, in the co. of Warwick, manufacturer, for "*A new or improved portable holder or vessel and cover, intended to be used as a receptacle for excreta and other sanitary or general purposes where a perfect air-tight cover is required.*" Sept. 25, 1871.

2534.—Charles Robert Mathews, of 52, High Street, Bloomsbury, in the co. of Middlesex, gas engineer and gas lantern and lamp manufacturer, for "*Improvements in apparatus for a safe, speedy, and easy mode in fixing, connecting, and disconnecting gas-pendants, brackets, pillars, and ground connexions for theatrical purposes, also for connecting and supplying gas to railway carriages, especially adapted for outside reflecting-lamps.*" Sept. 26, 1871.

2541.—André Bresson, of 7, Falcon Street, in the City of London, engineer, for "*An improved system of manufacturing asphalte.*" Sept. 27, 1871.

2552.—Frederick Lacey, of Birmingham, in the co. of Warwick, caster, for "*An improved apparatus for ventilating rooms.*" Sept. 28, 1871.

2554.—William Robert Lake, of the firm of Haseltine, Lake, and Co., Southampton Buildings, London, patent agents, for "*Improvements in the manufacture of artificial asphalte rock.*" A communication. (Complete specification.) Sept. 28, 1871.

2567.—Charles de Chastelain, of Caprera Lodge, Wandsworth, in the co. of Surrey, gentleman, for "*Improvements in the mode of and apparatus for intercepting, collecting, and treating fœcal and sewage or drainage matters.*" Sept. 29, 1871.

2574.—Thomas George Greenstreet, of 142, New Kent Road, in the co. of Surrey, surveyor, for "*The cleansing of streets, roads, and thoroughfares.*" Sept. 29, 1871.

2578.—Mathew Wilson, of Hills Place, Oxford Street, in the co. of Middlesex, for "*Improvements in stench-traps.*" Sept. 29, 1871.

2586.—Joseph Rogers, of St. John Street Road, and Gustave de Meirelles Soares, of York Buidings, Adelphi, both in the co. of Middlesex, for "*Improvements in the manufacture of bituminous asphaltic paving or covering for roads and other ways, and in the means of strengthening the surfaces of the same to facilitate traffic thereon.*" Sept. 30, 1871.

2593.—Thomas Waller, of 47, Fish Street Hill, in the City of London, engineer, for "*Improved arrangements for the supply of fresh hot or cold air, or mixed hot and cold air, in infirmaries, hospitals, and other buildings.*" Oct. 2, 1871.

2599.—William Robert Lake, of the firm of Haseltine, Lake, and Co., Southampton Buildings, London, patent agents, for "*Improvements in the manufacture of inflammable gas, and in apparatus employed therefor.*" A communication. (Complete specification.) Oct. 2, 1871.

2606.—William Thomas Walker, of 7, Holly Terrace, Highgate, in the co. of Middlesex, for "*Improvements in apparatus used in gas-works for cleansing and purifying gas from ammonia and other impurities.*" Oct. 3, 1871.

2609.—Thomas Ball, of Nottingham, gentleman, for "*Improvements in the treatment of ammoniacal liquor and lime resulting from the manufacture and purification of gas in gas-works.*" Oct. 3, 1871.

2613.—John Henry Johnson, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in water-meters.*" A communication. Oct. 3, 1871.

2625.—Frank Candy, of New Barnet, in the co. of Herts, for "*Improvements in making roads, ways, and floors.*" Oct. 4, 1871.

2626.—William Irlam Ellis, of Murray Street, Higher Broughton, Manchester, in the co. of Lancaster, engineer, for "*Improvements in machinery for forcing and exhausting air or other gases.*" Oct. 4, 1871.

GRANTS OF PROVISIONAL PROTECTION.

1737.—Henry Bessemer, of Queen Street Place, Cannon Street, in the City of London, for "*Improvements in the construction of pavements or floors of the class generally known as asphalte pavement or floors.*" July 4, 1871.

2053.—Edme Augustin Chameroy, of 123, Boulevard de Strasbourg, Paris, for "*Improvements in apparatus for regulating the pressure in delivery-pipes of water, gas, steam, and other fluids.*" Aug. 2, 1871.

2189.—William Henry Moore, of 11, High Street, Denmark Hill, in the co. of Surrey, for "*Improvements in filters.*" Aug. 19, 1871.

2428.—William Henry Westo and Miguel Pinder, both of Walworth, in the co. of Surrey, for "*Improvements in or connected with overflow or waste-pipes for water-cisterns.*" Sept. 15, 1871.

2443.—Charles Naylor, of Liverpool, in the co. of Lancaster, for "*Improvements in commodes or closets for sanitary purposes.*" Sept. 16, 1871.

2446.—David Bruce Peebles, of the Fountainbridge Works, Edinburgh, in the co. of Mid Lothian, N.B., engineer, for "*Improvements in gas-regulators.*" Sept. 16, 1871.

2451.—Alexander Melville Clark, of 53, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in cocks or valves.*" A communication. Sept. 16, 1871.

2462.—William Pawson, of Westgate, Grantham, in the co. of Lincoln, plumber, for "*Improvements in taps or valves for hot and cold water apparatus.*" Sept. 19, 1871.

2469.—Charles Pinn, of Friars Green, in the parish of Holy Trinity, and of Queen Street, in the parish of St. David, in the city of Exeter, for "*A water-supply apparatus for the prevention of waste of water in dwelling-houses buildings, and other premises where water is supplied by means of pipes.*' Sept. 19, 1871.

2470.—John Owen, of Bowden, in the co. of Chester, for "*Improvements in the construction of high-pressure filters.*" Sept. 20, 1871.

2510.—William Edward Gedge, of 11, Wellington Street, Strand, in the co. of Middlesex, patent agent, for "*A new or improved lighting and heating apparatus.*" A communication. Sept. 23, 1871.

2512.—John Bell Muschamp, of Kensington, in the co. of Middlesex, paper maker, for "*A new or improved liquid-meter.*" Sept. 23, 1871.

INVENTIONS PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF A COMPLETE SPECIFICATION.

2496.—Theodore Deffis, of Rue Richer, Paris, for "*Improvements in glass lights.*" A communication. Sept. 22, 1871.

2554.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., Southampton Buildings, London, patent agents, for "*Improvements in the manufacture of artificial asphalte rock.*" A communication. Sept. 28, 1871.

2599.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., Southampton Buildings, London, patent agents, for "*Improvements in the manufacture of inflammable gases, and in apparatus employed therefor.*" A communication. Oct. 2, 1871.

NOTICES TO PROCEED.

1316.—JOSEPH SOUTHWOOD, of Leeds, in the co. of York, for "*Improvements in apparatus for receiving excrement and urine in connexion with water-closets, privies, and commodes, and in the cleansing and removal thereof.*" May 16, 1871.

1482.—THADDEUS HYATT, of Gloucester Gardens, Hyde Park, in the co. of Middlesex, for "*Improvements in illuminating gratings suitable for streets, roads, footways, roofs, and other parts of buildings, and in the glasses for the same.*" June 3, 1871.

1565.—ANTHONY KENT, of Twickenham, in the co. of Middlesex, clerk, for "*Improvements in apparatus for charging and discharging gas-retorts, and other similar purposes.*" June 13, 1871.

2047.—JAMES HOSKEN, of 58, Fenchurch Street, in the City of London, engineer, and FRANCIS GEORGE FLEURY, of 24, Merrick Square, Southwark, in the co. of Surrey, engineer, for "*Improvements in water-waste preventers, or automatic apparatus for regulating the flow of liquids from constant supply pipes or vessels.*" Aug. 3, 1871.

2063.—GEORGE GOLDSMITH and JAMES DILKES, both of Leicester, in the co. of Leicester, for "*Improvements in apparatus for heating by gas.*" Aug. 4, 1871.

2081.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in utilizing the gases from blast-furnaces, and in the apparatus or means employed therein.*" A communication. Aug. 7, 1871.

2116.—THADDEUS HYATT, of Gloucester Gardens, Hyde Park, in the co. of Middlesex, for "*Improvements in illuminating gratings for roofs and footways.*" Aug. 10, 1871.

2263.—WILLIAM WEBB, of 17, Evelyn Street, New Town, Deptford, in the co. of Kent, for "*Improvements in joints or connexions for uniting the ends of soft metal pipes to one another, and to other pipes and cocks and union-pieces.*" Aug. 28, 1871.

2274.—HENRY BRIGHT, of Leamington, in the co. of Warwick, for "*Improvements in the means and apparatus for drying sewage and other matters, and destroying noxious vapours arising therefrom.*" Aug. 30, 1871.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2598.—ALEXANDER ROLLASON, "*Improvements in purifying coal gas and obtaining ammonia from coal-gas products.*" Aug. 20, 1868.

2700.—WILLIAM CARTWRIGHT HOLMES, "*Improvements in apparatus used in the manufacture of gas.*" Sept. 1, 1868.

2752.—GEORGE DAVIES, "*An improved meter for water or other incompressible fluid.*" Sept. 7, 1868.

2863.—WILLIAM EDWARD NEWTON, "*Improvements in apparatus for raising water and other fluids.*" Sept. 17, 1868.

2898.—JOHN HENRY JOHNSON, "*Improvements in machinery or apparatus for lighting and regulating the flow of gas employed for illuminating purposes.*" Sept. 19, 1868.

2902.—CHARLES WHEELER, "*Improvements in apparatus, taps, or joints for turning on and cutting off the supply of liquids and fluids.*" Sept. 21, 1868.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2025.—ALFRED COLERICK PILLINER and JAMES CHARLES HILL, "*Improvements in obtaining motive power, which improvements are applicable to measuring, raising, and forcing fluids.*" Aug. 13, 1864.

2044.—WILLIAM DALZIEL, "*Improved apparatus for regulating the pressure and supply of gases or elastic fluids.*" Aug. 17, 1864.

2050.—JOHN JOSEPH PARKES, "*Improvements in the application of gas and other fluids or liquids for lighting and other purposes, and in apparatus connected therewith.*" Aug. 18, 1864.

2089.—EDWARD TAYLOR BELLHOUSE and WILLIAM JOHN DORNING, "*Certain improvements in stop-cocks, taps, or valves to be employed in connexion with hydraulic pumps and presses.*" Aug. 24, 1864.

2161.—RICHARD ARCHIBALD BROOMAN, "*Improvements in washers or means of making the joints of metal pipes and other metal articles tight.*" Sept. 2, 1864.

2178.—THOMAS HENRY BAKER and THOMAS WOODROFFE, "*Improvements in filtering apparatus for filtering water and other liquids.*" Sept. 6, 1864.

2277.—RICHARD CHRIMES, "*Improvements in hydrants or fire-cocks.*" Sept. 17, 1864.

2315.—EDWARD THOMAS HUGHES, "*An improved fan, to be employed for ventilating and other purposes.*" Sept. 21, 1864.

2329.—THOMAS WALKER and THOMAS FERDINAND WALKER, "*Improvements in means or apparatus for the utilization of sewage matters, part of which improvements is applicable to raising and forcing other fluids.*" Sept. 22, 1864.

TURNER & ALLEN,

201, UPPER THAMES STREET,

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GAS & WATER ENGINEERS.

CONTRACTORS FOR THE SUPPLY OF

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TO

GAS, WATER, & RAILWAY COMPANIES, LOCAL BOARDS, SHIPPERS, &c.

Complete Pattern and Price Book, 3s. 6d. post free.

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1 in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle and Middlesboro'.	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	4 8 0	3 1 6	2 13 6	3 15 0	3 15 0
1¼ and 2-inch Socket-pipes	7 10 0	6 10 0	6 7 6	6 15 0	7 0 0
2½ and 3-inch ditto	6 15 0	5 15 0	5 7 6	5 15 0	6 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 5 0	5 12 6	5 17 6
6 inches and upwards ditto	6 5 0	5 5 0	5 0 0	5 7 6	5 15 0
Retorts, 1st fusion, hot blast	6 0 0	5 0 0	4 15 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	6 0 0	5 15 0	6 10 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 5 0	6 0 0	6 10 0

WROUGHT-IRON TUBING,

Subject to 60 per cent. Discount.

	⅜ in.	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 14 feet—per foot	1 8	1 1	0 10	0 7	0 5	0 4½	0 3
Ditto ditto, from 12 in. to 23½ in.—each	3 0	2 0	1 6	1 1	0 9	0 8	0 6
Long Screws, from 12 in. upwards	4 0	2 3	2 0	1 6	1 2	0 11	0 9
Bends and Springs	4 3	2 3	1 9	1 3	0 11	0 8	0 6
Square Elbows, equal or reducing; Round Elbows, 5 per cent. extra	3 9	2 3	1 9	1 3	0 10	0 8	0 6
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 9	0 7
Crosses, ditto, equal or reducing	4 9	3 6	2 0	2 3	1 9	1 6	1 3
Iron Cocks	20 9	13 0	10 0	7 3	5 0	3 8	2 8
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6	3 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4½	0 3
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3	—
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—	—

FREIGHTS.

Coastwise—Newcastle:—	Per Ton.	*Foreign.—*	Per Keel.
Chatham and Rochester	6s. 0d	Barcelona	£20 10s
Cork	8 0	Bordeaux	10 10
Dover, Folkestone, & Ramsgate	6 6	Boulogne and Calais	8 10
Dublin	8 0	Cadiz	15 0
Exeter Quay	9 0	Cronstadt	10 10
Ipswich	5 6	Copenhagen	9 10
London (from Leith)	6 6	Genoa	18 0
London (Pool)	7 0	Hamburg	9 10
Lowestoft and Yarmouth	5 3	Havre de Grace	—
Portsmouth & Southampton	7s. to 8 0	Leghorn	18 10
Plymouth	7 6	Lisbon	10 10
Shoreham	8 0	Rotterdam	9 15
Whitstable	6 9	Stettin	12 10
Weymouth	8 3	Trieste	18 10
		Venice	21 0

SUNDRIES.

Best Newcastle Fire-bricks, per 1000	£2 10s. to £2 15s. 0d.
Cliff's Fire-bricks (at Wortley), per 1000	2 15 6
Ingham's ditto (at Wortley), per 1000	2 15 0
Parnley Iron Co.'s Fire-bricks (at Wortley), less discount	2 17 0
Fire-clay Retorts, per foot run	5s. 6d. to 6 7 6
Tarred Rope Yarn, per cwt.	1 0 0

GAS COALS.

Newcastle—Unscreened:—	Per Ton 6s. 6d.
Haswells, Nettlesworth Primrose, and South Pelaw	
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	7 6
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	17 6
Wigan Cannel (at Liverpool)	17 0

Scotch Cannel, f.o.b.:—	Per Ton.	*Scotch Cannel, f.o.b.:—*	Per Ton.
Boghead—at Bo'ness, 47s. 6d.; at Leith	48s. 2d	Arniston (at Leith)	21s. 0d
Muirkirk	27 0	Wemyss (at Wemyss)	20 0
Kirkness, best (at Burntisland)	22 6	Haywood Co.'s Haywood (at Granton)	21 0
Capeldrae, 1st quality (at ditto)	22 6	Pirnie, or Methill	17 0
Ditto, 2nd ditto (at ditto)	17 6	Lothian's Cannel (at Leith)	24 6
Cowdenbeath (at ditto)	12 0	Grange ditto (at Bridgeness)	17 6
Lochgelly (at ditto)	12 0	Kinniel ditto (at Bo'ness)	17 6
Donnibristle—at Burntisland, 12s.; at Aberdour	12 6	Mylee' ditto	23 6
Auchinheath Lesmahago (at Granton)	27 0	Lochore Parrot (at Burntisland)	25 0
Duke of Hamilton's Lesmahago (at Granton)	27 0	Waverley Seam (at do.)	16 0
		Lanemark (at Glasgow)	16 0
		Elphinstone Tower (at Leith)	20 0

WEEKLY METAL REPORT.

(*From* J. BERGER SPENCE & Co.'s *Circular.*)

Iron.—"Ayresome" Yorkshire pig iron, No. 1, 53s.; No. 2, 52s. 6d.; No. 3, 51s.; No. 4 (foundry), 50s.; No. 4 (forge), 50s., net cash, or 1s. extra four months. Scotch pig, 60s. 6d. to 61s. Welsh bars, £7 to £7 10s. Staffordshire bars, £8 10s. to £9. Hoop iron, £9 10s. Gas-tubes, 60 to 67½ per cent. off list. Boiler-tubes, 40 to 42½ per cent.——*Copper.*—English tough ingot, £75 to £76. Chili bars, £67 10s. to £68.——*Tin.*—English ingot, £141 to 142. Straits, £135 to £136.——*Tin-Plates.*—Coke, IC, 24s. to 26s.; charcoal, IC, 30s. to 32s. per box.——*Lead.*—Best English soft pig, £18 to £18 5s. Refined red lead, £20 10s. to £21.——*Antimony.*—French Star, £47 to £48.——*Spelter.*—Silesian, special brands, £18 10s. to £19; English, best brands, £18 10s. to £19.

DUKE OF HAMILTON'S
LESMAHAGOW GAS COAL.

LESSEES:

LESMAHAGOW AND LONGLEE COAL COMPANY,

Office—5, DIXON STREET, GLASGOW.

Works—BLACKWOOD & SOUTHFIELD, LESMAHAGOW.

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JAMES MILLER, SON, & Co.,

1, GREAT ST. HELEN'S, LONDON, E.C.,

AND

75, UNION STREET, GLASGOW.

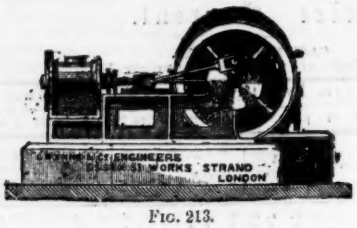


FIG. 213.

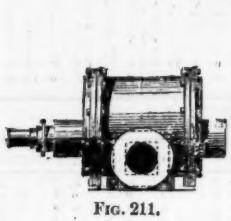


FIG. 211.

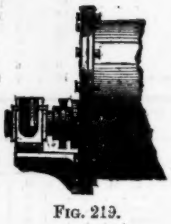


FIG. 219.

GWYNNE & COMPANY,

HYDRAULIC, MECHANICAL, AND GAS ENGINEERS,

ESSEX STREET WORKS, STRAND,

London, W.C.,

SOLE MANUFACTURERS OF

BEALE'S IMPROVED PATENT GAS-EXHAUSTER,

Under the personal superintendence of Mr. BEALE.

REDUCED PRICES AND INCREASED CAPACITY.

Also manufacturers of Improved Hydraulic Regulators, to actuate a steam or gas throttle-valve to suit the make of gas; self-acting bye-pass valves, to move by hand or otherwise; improved stop-valves, with faced flanges, forming the neat adjunct to Exhauster of valve and elbow combined. Two of the largest Gas-Exhausters belonging to London Companies are now altered to our new principle, and are working most successfully.

The Gas-Exhausters may be made with inside or outside bearing, as shown in Figs. 211 and 219.

Fig. 213 shows the Improved Gas-Exhauster attached to, and driven by one of GWYNNE AND CO.'s well-known high-speed Horizontal Steam-Engines, without any intermediate gearing. This arrangement is extremely compact, and is beautifully adapted for small or large Gas-Works, and the foundations and erection are both very simple and inexpensive.

Prices and every information upon application to GWYNNE AND CO. *as above.*

DUKE OF HAMILTON'S

LESMAHAGOW GAS COAL.

The superior quality of this well-known Cannel, as wrought by

THE NITSHILL AND LESMAHAGOW COAL COMPANY,

Is now generally admitted by all Gas Engineers.

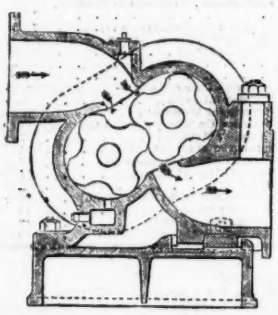
PRICE AND ANALYSIS MAY BE HAD ON APPLICATION TO

JAMES M'KELVIE, HAYMARKET, EDINBURGH.

LEETE AND EDWARDS,

SOLE MAKERS OF

FORBES'S PATENT ROTARY PUMP,



THE VERY BEST PUMP YET INTRODUCED FOR

TAR, OIL, AMMONIACAL LIQUOR, or WATER.

In use at several of the largest Gas-Works; also Oil, Tar, Sugar, and other Works in London.

FOR TESTIMONIALS AND PARTICULARS, APPLY AT

366 AND 368, EUSTON ROAD, LONDON, N.W.

ARMSTRONG'S

SAFETY LAMP

FOR GAS-WORKS,

Or for any purpose where a good light and safety are required.

This lamp has been in use in most of the English and Foreign Gas-Works for many years, giving entire satisfaction.

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GAS-METER

MANUFACTURER,

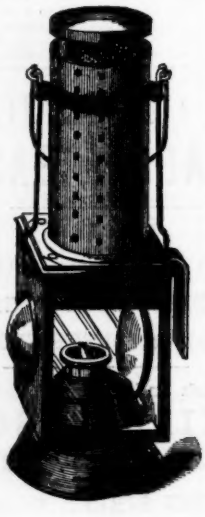
GAS AND HOT WATER

ENGINEER,

43, MANCHESTER STREET,

KING'S CROSS.

Gas-Works for Mansions Erected.



TO INVENTORS & PATENTEES.

MR. W. H. BENNETT,

Having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

THOMAS EDINGTON & SONS,

PHŒNIX IRON-WORKS,

GLASGOW,

MANUFACTURERS OF

GAS AND WATER PIPES,

All sizes up to 4 ft. diameter;

RAILWAY CHAIRS AND SLEEPERS,

and general Castings. Also

GREGORY'S & COCKBURN-MUIR'S

PERMANENT WAY.

London Office: 63, OLD BROAD STREET, E.C.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

WANTED, a situation as Gas-Fitter and Repairer of Meters, or Working Foreman, by a good workman. Good references.
Address JAMES HOLLOWAY, 15, Lord Street, Islington Street, Altrincham, CHESHIRE.

WANTED, a situation as Gas-Fitter, by a steady workman, aged 30. Good reference, if required.
Apply to H. NEWTON, 10, Burns Street, Osmond Street, C. U. M., MANCHESTER.

SHEFFIELD UNITED GASLIGHT COMPANY.

WANTED, by the above Company, an experienced and steady resident FOREMAN, to take charge of one of the Company's gas stations. He must understand the manufacture and distribution of gas.
Applications to be addressed to the chairman, giving references, and stating age and salary required.

WANTED, by the Advertiser, aged 28, an engagement as MANAGER or SECRETARY and MANAGER. Is well experienced with the manufacture and distribution of gas, and able to take the entire control of the works in all its branches; understands keeping of accounts and collecting. Unexceptionable testimonials.
Address STANLEY, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS COMPANIES AND OTHERS.

THE Advertiser is open for an engage- ment as MANAGER, to enter on duties after September next. He has now the management of a Gas-Work where the make of gas is over 30 millions annually.
Apply to A. D., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Oriental Gas Company, Limited, require the services of a thoroughly qualified practical Man to fill the post of OUTDOOR SUPERINTENDENT. The duties will include the supervision of the public lighting and main-laying. Age not to exceed 35 years. Commencing salary £30 per month, with free passage out and home.
Address, with references, to A. HERSEE, Esq., Secretary, 39, Old Broad Street, LONDON.

WANTED, a Second-hand Gasholder- TANK, to serve for a Tar-Tank. Apply, stating price and diameter, to G. BERRY, Engineer and Manager of Gas-Works, Ashford, KENT.

WANTED, a Second-hand Station- METER, to register 4000 feet per hour. State age, maker's name, price, with or without bye-pass and connexions, delivered at nearest railway station.
Address ZELATA, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

STATION-METER FOR SALE, to pass 30,000 feet per hour. Is of the best description, and nearly as good as new.
Apply at the Brighton and Hove General Gas Company's Works, Hove, near BRIGHTON.

FOR SALE, the entire Plant of a small Gas-Work, capable of making 30,000 feet per diem. Canal along side.
Apply to Mr. MEACOCK, Norwood Green, MIDDLESEX; or 15 and 16, GILTSPUR STREET, E.C.

FOR SALE, a quantity of Mouthpieces, for 15-in. Circular Retorts, with rising pipes, H and dip pipes, and hydraulic main. All in good condition, and recently thrown out of use at the Gas-Works, Boston, Lincolnshire.
Apply, for particulars, to the Company's Engineer, Mr. R. P. SPICE, 21, Parliament Street, WESTMINSTER, S.W.

ON SALE, a good second-hand Station- METER, 8000 feet per hour, West and Gregson make, bye-pass, &c.
Apply to W. LONGWORTH, Gas Offices, Dukinfield, MANCHESTER.

TO GASHOLDER MAKERS.

THE Buxton Local Board is prepared to receive TENDERS for a 45 ft. Double-lift GASHOLDER, to be erected in a tank to be constructed at their works at Buxton.
Drawings and specifications may be seen, and tracings, with copy of specifications, price 10s. 6d., may be had, on application to the Manager, at the Gas-Works, Buxton, on and after Saturday, the 14th inst.
Sealed tenders, endorsed "Tender for Gasholder," to be sent to the Buxton Local Board not later than the 24th inst.
The lowest tender will not necessarily be accepted.
JOSIAH TAYLOR, Clerk to the said Board.
Buxton, Oct. 5, 1871.

PRIVATE TELEGRAPHS FOR GAS AND WATER WORKS.

THE Electric Telegraph Department of our business is most efficiently conducted by an experienced staff. CONTRACTS entered into for maintenance and erection of lines for Gas and Water Companies, private residences, hotels, &c. Bailey's simple A B C instrument is stronger and less liable to derangement than any other in the market. Price £6 per pair. Makers of maximum and minimum Electrical Indicators and Signals for Reservoirs. Water Pressure Recorders. Managers of Gas and Water Works are invited to ask us for our quotations, or for any information connected with Telegraphy.

Just published, 800 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.
J. BAILEY and Co., Albion Works, Salford, Lancashire.

MODERN STREET LIGHTING, by WILLIAM SUGG, A.I.C.E., price 1s. 6d., is now ready, and will be forwarded post free for 19 stamps.
W. SUGG, Vincent Works, Vincent St., WESTMINSTER, S.W.

A SAD STORY.

AN EARNEST APPEAL is made to the Gas World and others on behalf of the WIDOW and Three Infant Children of the late Mr. FREDK. RICHARDS, who lost his life by a fall of sand while engaged in putting in the syphons for a gas-tank at the Wilmslow Gas-Works on the 5th of August, he being at that time Engineer and Manager for the Company. His family, by this calamity, is left TOTALLY DESTITUTE.

Contributions will be received and duly acknowledged in the JOURNAL OF GAS LIGHTING, by T. G. BARLOW, Esq., C.E., 42, Parliament Street, WESTMINSTER, who has kindly consented to act as Treasurer.

A Committee has been formed to administer the Fund, consisting of the following gentlemen, either of whom will be happy to receive contributions:—

Dr. BOWER, Surgeon, Wilmslow.
Mr. W. MABON, Ardwick Iron-Works, Manchester.
Mr. ALFRED PENNY, Wharf Road, City Road, London.

Subscriptions already acknowledged	£120	16	6
Henry Sainsbury, Trowbridge . .	0	10	6
J. Barclay, Tottenham	1	1	0
W. H. Bennett, London	1	1	0
George Evans, Norwich.	0	10	6
A. H. Wood, Hastings	1	1	0
E. Goddard, Ipswich	1	1	0
A. Owst-Atkinson, Hull	2	2	0
R. P. Spice, London	2	2	0
H. Finlay, London	1	1	0
W. J. Warner, South Shields . .	2	2	0
J. M'Millan, Newry	0	10	6
T. H. Methven, Bury St. Edmund's .	1	0	0

BAHIA GAS COMPANY, LIMITED.
NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of this Company will be held at the Offices of this Company, No. 10, Coleman Street, London, on TUESDAY, the 24th day of October, 1871, to receive the Report of the Directors, the Balance-Sheet approved by the Auditors, and for general purposes.
The chair will be taken at Three o'clock precisely.
By order of the Board,
Oct. 3, 1871. ALFRED J. HEAD, Secretary.

TO GASHOLDER MAKERS.

THE Directors of the Independent Gas- light and Coke Company invite TENDERS for the erection of a GASHOLDER on their works at Haggerston. Specifications may be obtained and plans seen on application to Mr. R. J. Laing, Engineer.
Tenders to be sent in, addressed to me, not later than Tuesday, the 24th of October, and marked on the outside "Tender for Gasholder."—By order,
JAMES B. COULSON, Secretary.
236, Kingsland Road, Sept. 26, 1871.

DUDLEY UNION.

TO GAS ENGINEERS, &c.

THE Guardians of the Dudley Union are desirous of receiving ESTIMATES for the erection of a GAS-WORK, on their grounds, attached to the Workhouse, capable of supplying 500 lights.
The estimates to include expense of gasholder, all erections and other necessary appliances for the manufacture and purification of gas.
All communications and estimates to be addressed to the undersigned. The estimates to be sent in on or before the 26th inst.—By order of the Board,
THOMAS ALLEN, Jun., Clerk.
Union Offices, Dudley, Oct. 7, 1871.

CLOTH Gas-Bags for Gas-Mains, as supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Suction and Delivery Hose, Leather Driving-Bands, and Stokers Gloves.
T. BUGDEN, Manufacturer, 79, Goswell Road, LONDON.

EDGE'S PATENT
FOR REMOVING THE
CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

"*Gas-Works, Leicester, Oct.* 28, 1870.
"Dear Sir,—I have used Edge's patent process for scurfing the Retorts at these works during the last twelve months, and I have great pleasure in testifying to its efficiency and economy; it is exceedingly simple, and can very readily be applied.—I am, dear sir, yours truly,
"E. Goddard, Esq." "ALFRED ROBINSON.

For particulars and terms, apply to E. GODDARD, Sole Agent, Gas-Works, IPSWICH.

CAST-IRON Retorts, Socket-Pipes, with Syphons, and all requisite Connexions, Lamp Columns, Wrought-Iron Tubing, Valves, Street-Lamps, Sight Holes, Furnace Doors, Ash-Pans, Charging and Coke Shovels, Iron Pails, Coke Barrows, Cross Bars, Fire Pots, Pumps, and Iron Borings.
PURIFIERS, CONDENSERS, & SCRUBBERS erected complete, or the materials supplied; and every description of goods in use by Gas-Works, in stock, at wholesale prices, at
Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street, LONDON.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101, Cannon Street, E.C.

MANUFACTURE AND DISTRIBUTION ACCOUNTS.

Mr. W. J. WARNER
Begs to say that in consequence of the number of inquiries he has received relative to the above form of Accounts, which he had the pleasure of submitting to the
BRITISH ASSOCIATION OF GAS MANAGERS,
AT THEIR LATE MEETING IN DUBLIN,
he has been induced to publish them, and is now prepared to supply the two sheets, post free, for 5s.
Applications to be made to
Mr. W. J. WARNER,
Engineer,
GAS-WORKS, SOUTH SHIELDS.

ALFRED LASS,
ACCOUNTANT,
28, NORTH STREET, WANDSWORTH, S.W.
Mr. Alfred Lass having had considerable experience in arranging, making up, balancing and auditing gas accounts, begs to inform the Directors of Gas Companies that he may be consulted on all matters relating thereto.
Balance-sheets prepared, Accounts audited, Consultations, Agencies, &c.

BOOKS FOR GAS ACCOUNTS.

ALFRED DOUBBLE & Co., 2, Serjeants INN, and 40, FLEET STREET, LONDON, make and supply all the various ACCOUNT-BOOKS as approved and adopted by Accountants, &c., to Gas Companies.
A complete set of the Books and Forms forwarded within a few days from receipt of order.

EDWARD SANDELL, Public Accountant and Auditor, 4, Skinner's Place, Size Lane, LONDON.
The projector of the *Original Gas Companies Analyzed Expenditure Account-Book* offers his experience and services in the examination, preparation, and production of all accounts in reference to Gas Companies. References if required.

SAMUEL PONTIFEX, Consulting Gas Engineer, having retired from the Great Central Gas Company, is now prepared to furnish PLANS and SPECIFICATIONS, as well as ADVISE Provincial Gas Companies as to the erection of new, or alteration and enlargement of existing works.
Offices: 22, Coleman Street, LONDON, E.C.

ALFRED PENNY, Gas and Consulting ENGINEER,
WENLOCK IRON-WORKS,
21, WHARF ROAD, CITY ROAD, LONDON.
Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, and T-pieces, &c., &c.
Plans, Specifications, and Estimates prepared.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.
HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, E.C., and 133, Regent Street, LONDON. Agents wanted.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.
N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for
good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

B. CARPENTER'S
IMPROVED
WOOD SIEVES FOR GAS PURIFIERS.
WORKS:
22, HERMES STREET, PENTONVILLE ROAD,
LONDON, N.
The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.
Testimonials from Gas Engineers who have tested their qualities forwarded on application.
All orders punctually attended to, and estimates given if required.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

(Incorporated by and acting under the powers of Special Ordinances enacted by the Governor and Court of Policy of the Colony of British Guiana, No. 21 of the year 1870, and No. 11 of the year 1871.)

CAPITAL, £40,000, IN 8000 SHARES OF £5 EACH

(Of which 3770 have been applied for previously to the issue of this Prospectus, leaving 4230 to be now subscribed).

Deposit on Application, £1 per Share. *Deposit on Allotment, £1 per Share.*

No future Call to exceed £1 per Share, and the intervals between each Call not to be less than Three Months.

DIRECTORS IN LONDON.

THOMAS HUGHES, Esq., M.P., *Chairman*, 9, Old Square, Lincoln's Inn, W.C.
HENRY PALFREY STEPHENSON, *Deputy-Chairman*, M. Inst. C.E., Director of the Crystal Palace District Gas, and Bombay Gas Companies, &c., The Hermitage, Croydon.
ARTHUR CLARKE, St. Dunstan's House, St. Dunstan's Hill, E.C.
BALDWIN LATHAM, M. Inst. C.E., Whitgift Lodge, Croydon.
JOSEPH QUICK, M. Inst. C.E., Director of the Pará Gas Company, Sumner Street, Southwark, S.E.
CAPTAIN HENRY THURBURN, 43, Russell Road, Kensington, W.
MATTHEW WHITING, Lavender Hill, Wandsworth.

LOCAL DIRECTORS IN GEORGETOWN.

JOHN DRYSDALE, *Chairman*, Messrs. George Little & Co., Georgetown, Demerara.
ADOLPHUS WILLIAM PEROT, Messrs. A. W. Perot & Co., Georgetown, Demerara.
The Hon. GEORGE H. OLIVER, Messrs. Sandbach, Parker, & Co., Georgetown, Demerara.

AUDITORS. { ROBERT KING, Singapore Gas Company, Limited, 8, St. Mary Axe, E.C.
{ JAMES WADDELL, Messrs. J. Waddell & Co., Public Accountants, New Poultry Chambers, 7, Poultry, E.C.

SOLICITORS.—Messrs, WILKINS, BLYTH, & MARSLAND, 10, St. Swithin's Lane, E.C.
ENGINEER.—ALFRED WILLIAMS, 64, Bankside, Southwark, S.E.
SECRETARY.—GEORGE W. HARRIS, 6, Westminster Chambers, S.W.
BANKERS.—Messrs. SMITH, PAYNE, & SMITHS, 1, Lombard Street, E.C.; BRITISH GUIANA BANK, Georgetown, Demerara.
OFFICES.—6, Westminster Chambers, Victoria Street, London, S.W., and Georgetown, Demerara.

PROSPECTUS.

THE GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED, has been formed for the purpose of erecting Gas-Works and supplying Coal Gas to the city of Georgetown, Demerara.

Georgetown, the capital of British Guiana, is situated at the mouth of the River Demerara, and has a population of about 35,000. The streets are wide, at right angles to each other, having canals running through them, and lined with trees. Water Street, the commercial centre, is parallel to the river, a mile and a quarter in length, and 70 feet wide.

The Public Buildings and Colonial Establishments in Georgetown are—the Legislative Hall, Courts of Justice, Custom House and other Government Offices, Government House, two Cathedrals, ten Churches, two Colleges, Colonial and Seamen's Hospitals, Almshouse, Orphan Asylum, and School of Industry, Immigration Depôt, Military Barracks and Officers' Quarters, Central Police Station, County Goal, Museum, Library and News Room, Post Office, Assembly Rooms and Club, Athenæum, two Banks, Public Market, Railway Terminus, and Lighthouse.

As only the Churches and Lighthouse have been included in the Engineer's estimate, it may reasonably be expected that a considerable quantity of gas will be required to light the above-named buildings, in addition to the amount stated in the estimate.

Arrangements have been made for the purchase from the Demerara Gaslight Company of all their land, plant, and property, and all other rights, for the sum of 15,962·61 dols., or £3325 10s. 11d., to be paid in shares of this Company, with £2 paid up thereon, and the sum of 2525 dols., or £526 0s. 10d., in cash, and £300 additional in cash for expenses incurred in England, and for the visit of an Engineer to the Colony. The total being £4158 11s. 9d.

By an Ordinance enacted by His Excellency John Scott, Esquire, Governor and Commander-in-Chief in and over the Colony of British Guiana, with the advice and consent of the Honourable the Court of Policy of said Colony, on the 28th day of December, 1870, and published on the 31st following; and amended by an Ordinance enacted on the 26th day of June, 1871, and published on the 1st of July following, the Company has been incorporated with **perpetual succession, a Share Capital of £40,000** and borrowing powers limited to £10,000, and an **exclusive concession** has been granted for a term of twenty-five years, of the right of lighting the streets and public and private buildings within the city of Georgetown.

The costs of obtaining the above-named Ordinances are included in the purchase-money to be paid to the Demerara Gaslight Company; and as the Georgetown Gas Company is incorporated under those Ordinances, no expense will be incurred for the registration of the Company in England.

The limit of the charge per 1000 cubic feet for the gas is fixed by the Ordinance at 5 dols., equivalent to £1 0s. 10d., sterling, and the Company is only required to reduce the price of gas below that limit when its average yearly profits, after deducting 2½ per cent. for depreciation, shall exceed 15 per cent. per annum. In order, however, to stimulate the consumption, it is intended at first only to charge the full price to small consumers, and to supply the gas at the rate of 4·50 dols., or 18s. 9d. per 1,000 feet for a specified minimum quantity with prompt payment.

An Agreement has been entered into with the Town Council of Georgetown for lighting the street-lamps for a minimum period of five years, renewable every five years, at the option of the Town Council, during the term of the Company's concession, for the sum of 25 dols., equivalent to £5 4s. 2d. per annum for each lamp, for 293 nights in the year, burning 4½ feet of gas per hour of an illuminating power of 12 sperm candles; and if the Council require the supply for every night in the year, then the charge for each lamp will be 30 dols., equivalent to £6 5s. The number of lamps required to be fixed at first will be not less than 300.

It is estimated that the whole of the works required will be erected for a sum not exceeding £20,000, the Directors having received provisional tenders from several contractors for the supply and erection of all the works to be sent from this country, which justifies them in arriving at that conclusion. So soon as the allotment is made, fresh tenders will be taken. It is therefore anticipated that it will not be requisite at first to call up more than £3 per share. The proposed works will be of such capacity and design as to be not only adequate for present purposes, but adapted for an extension when necessary, without alteration of the first plant erected.

The Engineer's estimate of Revenue Working shows that on a capital of £25,000, a dividend may be expected of at least 10 per cent. per annum after the Company is fairly at work.

The following extract is from the Report of Mr. George Hudson, C.E., who visited Demerara at the request of the Directors, for the purpose of investigating the prospects of establishing Gas-Works in Georgetown:—

"DEMERARA, *23rd May*, 1870.

"Every one here promises to take gas, provided it is not more expensive than the present mode of lighting. At the first lighting up I think yon can safely calculate upon the undermentioned number of lights:—

	No. of Lights.	Burning per Month, each.	Cubic Feet per Month.
Street-lamps	300	294 hours	397,000
Churches	500	16 ,,	40,000
Private houses and shops	500	120 ,,	300,000
Lighthouse	1	365 ,,	10,950
Total			747,950
Average per day			24,931

"After the town is lighted up, I feel certain that within a very short time there will be a rapid increase in the number of lights, and the consumption of gas will soon amount to 50,000 or 60,000 cubic feet per day. The fitting up of the houses here will be very quickly done, on account of the ease of getting through wood buildings, instead of brick or stone. The stores in Water Street on the river side, which number about fifty, will burn about five lights each all night, for the watchmen's use. In a city built entirely of wood the risk from fire will be much lessened by this mode of lighting instead of candles or oil as at present."

Official copies of the Colonial Ordinances and photographs of the city of Georgetown, may be inspected at the Offices of the Company, 6, Westminster Chambers, Victoria Street, S.W.

Applications for Shares must be made on the annexed form. No allotment will be made unless all the shares are applied for, and in the event of no allotment being made, the deposit-money will be returned without any deduction.

6, WESTMINSTER CHAMBERS, VICTORIA STREET, S.W., *Oct.* 7, 1871.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

All Applications for Shares must be sent in on or before Tuesday, October 17th, 1871.

Now ready, demy 8vo, half bound roan, cloth sides, lettered, price 7s. 6d., by post 8s.,

THE GAS MANAGER'S HANDBOOK,

CONSISTING OF

TABLES, RULES, AND USEFUL INFORMATION

For GAS ENGINEERS, MANAGERS,

And others Engaged in the Manufacture and Distribution of Coal Gas.

By THOMAS NEWBIGGING A.I.C.E.

WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

A CHECK SYSTEM OF BOOK-KEEPING FOR GAS COMPANIES.

"Mr. Charles Hight, Public Accountant, of 26, Budge Row, has brought out a work most useful to gas companies, the practical application of which will render frauds impossible. . . . It is based on a principle ensuring the best possible check on the rental and the sales, with a greatly improved method of recording the expenditure. The plan is adapted to the Board of Trade regulations for the form and details of the half-yearly published accounts of the London companies."—*Globe.*

"An admirable plan. . . . Has the merit of simplicity."—*City Press.*

For instructions and forms, apply to NISSEN, PARKER, AND ARNOLD, 43, Mark Lane, LONDON, E.C.

TO GAS COMPANIES, ENGINEERS, BUILDERS, &c.

THE PATENT ANTI-GALVANIC PAINT

Is guaranteed to prevent and arrest Rust on all Ironwork, and to cover Tar most effectually. It is most valuable for protecting it from the action of salt water, rain, sulphurous and gaseous exhalations. It has been well tested at various Gas-Works, in covering Tar on Gasholders, Purifiers, &c., and has given great satisfaction. Sample cans for trial sent free of charge. All communications to be addressed to

Messrs. STEVENS, ORCHARD, & CO., 21, Great Winchester Street, LONDON.

Sole Proprietors of Calley's "Torbay" and Chemical Paints.

SCHOLL'S

PATENT PLATINUM

GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Extract from Dr. Frankland's Course of Lectures at the Royal School of Mines, February, 1868.

"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

Price 1s. each for Fishtail Burners.

To be had retail of Gas-Fitters and Ironmongers.

JOHN SCHOLL, Manufactory: 41 & 42, BERWICK STREET;

Retail Depot: 198a, OXFORD STREET, LONDON, W.

Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

*** Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gas-Fittings and Gas Apparatus.

OXIDE OF IRON.—We are prepared to supply, on moderate terms, HYDRATED PEROXIDE OF IRON (BOG OCHRE), Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

FRANCIS RITCHIE & SONS,

BELFAST.

TROTTER, HAINES, & CORBETT,

BRETTELL'S ESTATE

FIRE CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

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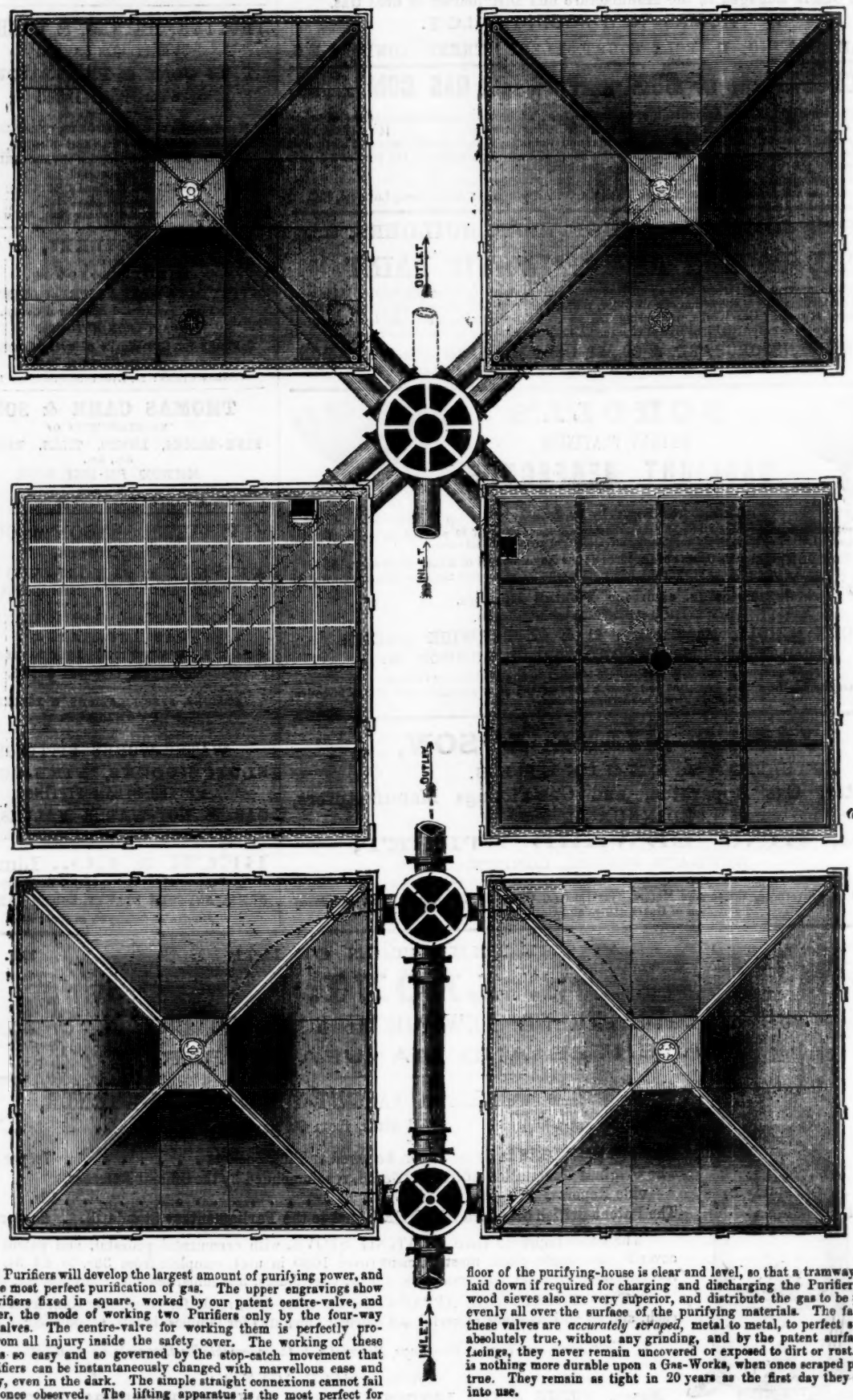
WORKED BY THEIR PATENT CENTRE-VALVES, &c.



These Purifiers will develop the largest amount of purifying power, and effect the most perfect purification of gas. The upper engravings show four Purifiers fixed in square, worked by our patent centre-valve, and the lower, the mode of working two Purifiers only by the four-way centre-valves. The centre-valve for working them is perfectly protected from all injury inside the safety cover. The working of these valves is so easy and so governed by the stop-catch movement that the Purifiers can be instantaneously changed with marvellous ease and certainty, even in the dark. The simple straight connexions cannot fail to be at once observed. The lifting apparatus is the most perfect for work, and one man can lift and travel a purifier-cover of any size. The floor of the purifying-house is clear and level, so that a tramway can be laid down if required for charging and discharging the Purifiers. The wood sieves also are very superior, and distribute the gas to be purified evenly all over the surface of the purifying materials. The facings to these valves are *accurately scraped*, metal to metal, to perfect surfaces, absolutely true, without any grinding, and by the patent surfaced bar facings, they never remain uncovered or exposed to dirt or rust. There is nothing more durable upon a Gas-Works, when once scraped perfectly true. They remain as tight in 20 years as the first day they are put into use.

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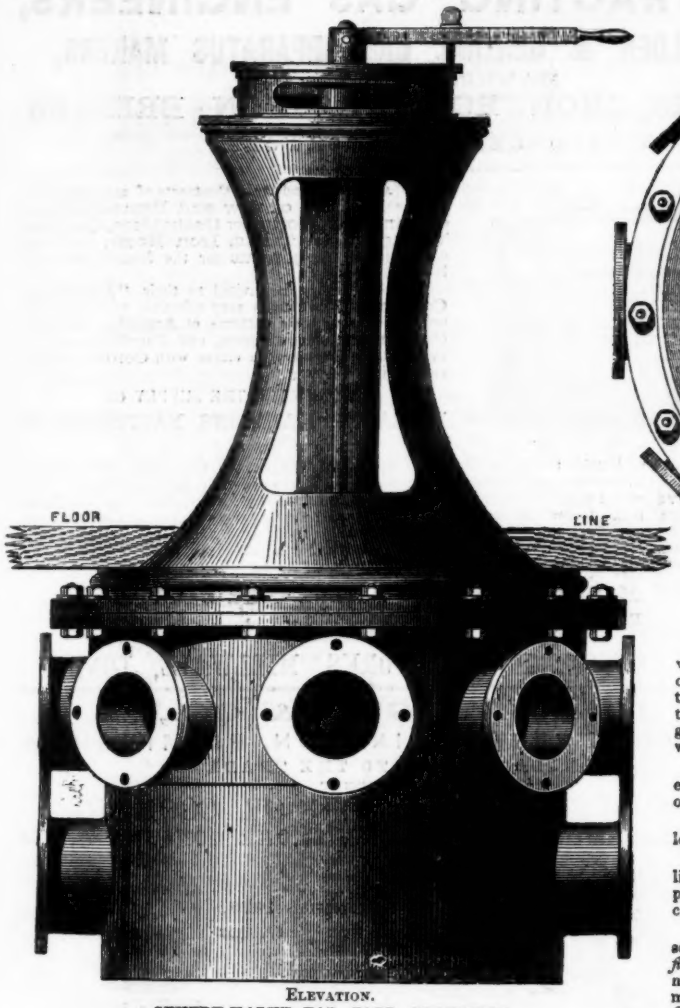
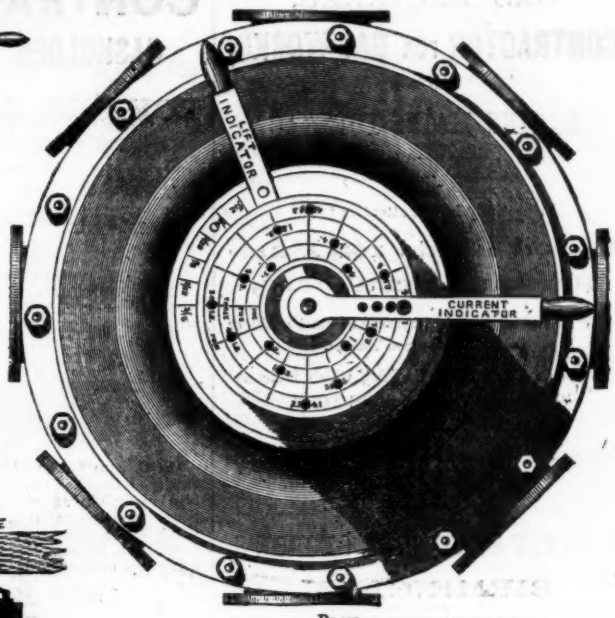
THE RECESSED CONE VALVE.

HOLLINSHEAD'S PATENT.



ELEVATION.

CENTRE-VALVE FOR FOUR PURIFIERS.



PLAN.

These Valves are adapted for every purpose and position about gas-works, &c. They are constructed on the principle of the ordinary plug-cock, the internal cones or plugs being formed with divisions, and both the cones or plugs and bodies of the Valves are *recessed* in such a manner that no part of the working surface is exposed to or in contact with the gas, *thus securing a minimum of friction*, and also the preservation of the working surface *from deposit or deterioration*.

They are provided with screw gearing for relieving the weight of and easing the plug while changing the Valve, so as to preclude the possibility of any sticking or straining.

The Centre Change-Valves and Bye-pass Valves for gas purposes, occupy less space than any other. All parts are easily accessible for examination.

The position of the Valve is changed so instantaneously that there is no liability, in the case of Centre Change-Valves for Purifiers, of impure gas passing forward into the holders during the time of changing, as is the case with Hydraulic Valves, and others used for the same purpose.

The Centre Change-Valves for Purifiers are for any number of Purifiers, so that the gas may be conducted *through the whole of the series of Purifiers*, commencing with any one of them, or shut off from any one or more at pleasure, thus enabling the whole of the purifying surface to be made available, passing the gas through any one, two, three, *or the whole four Purifiers* in succession, and in any desired order.

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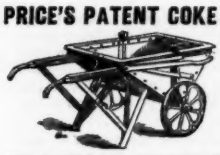

effecting a great saving of time, labour, and expense.

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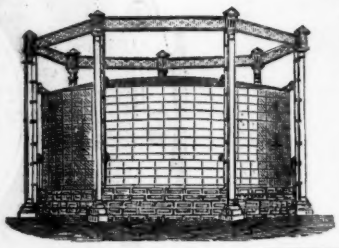

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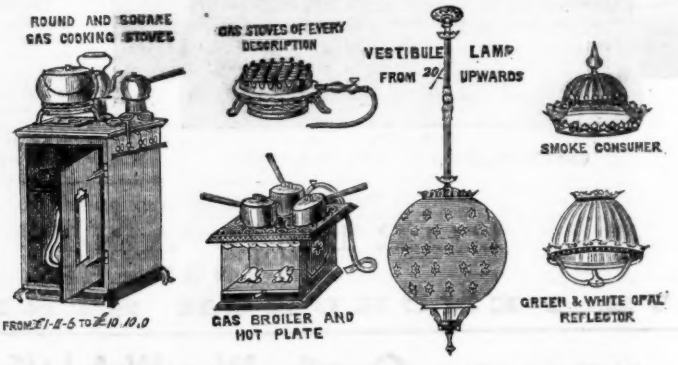
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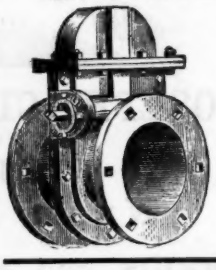

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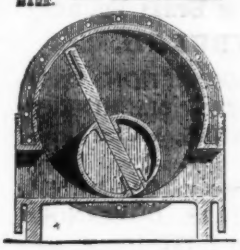

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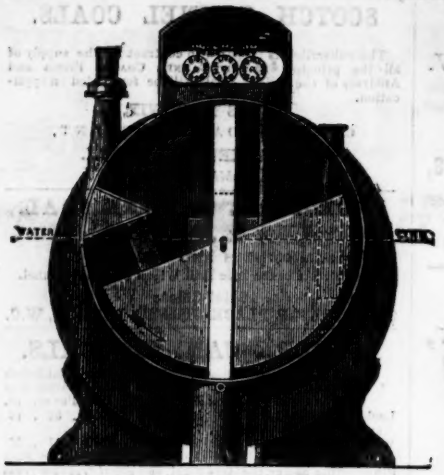

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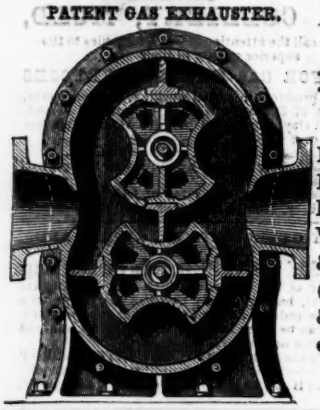

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